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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

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We understand that the Union Railroad of Pittsburg has signed the per diem agreement, and that a number of other railroads controlled by the United States Steel Corporation have taken the same course. Soon after the per diem arrangement took effect, some four years ago, we called attention to the fact that while some of the Steel Corporation railroads, such as the Bessemer & Lake Erie and the Elgin, Joliet & Eastern, had signed the agreement, this adhesion to the scheme was by no means universal with the Steel Corporation railroads. The impression was given that the Steel Corporation was picking and choosing, and only signing the per diem agreement when it was to the direct advantage of the line interested. It is gratifying to find that a more general adhesion to the scheme now appears to have been adopted, as it rounds out some pretty bad gaps in the per diem structure.

Roughly speaking, the New York, New Haven and Hartford Railroad Company now owns or controls some 800 miles of street railway track representing total market values of probably not less than $50,000,000—perhaps $10,000,000 more—of which say two-thirds are in Connecticut and about one-third in Massachusetts with a small outlying portion in suburban New York. Some newspaper reports now aver that the whole of this great property has been transferred to a "voluntary" association located at Boston, other reports say that the transfer only includes the Massachusetts properties—the Berkshire, Springfield and Worcester systems. There may be a sense in which both reports are true and the shifting of the Massachusetts properties be an immediate thing, while the transfer of the other properties is a remoter one contingent on future complications. However that may be, it is the situation in Massachusetts that commands attention and it is a most interesting one whether viewed practically or legally. The law of the State prohibits ownership directly or indirectly of street railway lines by steam railroad companies. To evade this law the New Haven corporation has thrown up three lines of intrenchment. It has (1) its big holding company, the Consolidated Railway Corporation, under an "omnibus" Connecticut charter; (2) local holding companies in Massachusetts, and (3) the new "voluntary" association at Boston. The spirit and intention of the law have been plain enough, but the State lax and dilatory in enforcing it. On the other hand, the technicalities of the case form a kind of statutory jungle and before the legal underbrush is cut through there are endless propositions to be tried out, some of which may have to go to the federal tribunals. The power of the State must be determined not merely in its bearing on a foreign holding corporation outside the State, but on local holding bodies inside the State, one of them consisting of just that kind of voluntary group whose legal status has so vexed the courts and which the State of Massachusetts herself, as represented by her railroad commission, has recognized as in the nature of an independent and private stockholder. If all the legal questions involved could, within reasonable time, be searched, sifted and expounded by the Massachusetts tribunals—saying nothing of higher courts—the rulings would have national values as throwing light on the standing before the law of holding corporations and of unchartered bodies. As the case stands, with grey beards likely to grow white before the mixed train reaches its legal terminus, the best guess is that in a year or two Massachusetts through the eyes of her legislature will see the impending invasion of steam by electricity and bow to the higher law of a physical fact.

NEW CAPITAL FOR GRANGER ROADS.

Among the important financial developments of the past week has been the announcement of capital stock increases by the two most prominent Chicago granger roads, the Chicago, Milwaukee & St. Paul and the Chicago & North-Western. For more than a year, or since the announcement of its determination to build a Pacific Coast extension, the plans of the St. Paul road for financing the 1,500 or more miles of new line have been the subject of continued interest. As conditions are not at present particularly favorable for a sale of bonds, while there is at the moment a boom under way in the stock market, the St. Paul has apparently concluded to delay the announcement of a complete plan for its new needs in the West and to finance immediate needs by the issue of new stock. On October 4, 1902, there was authorized $25,000,000 additional common stock. This action was at the time supposed to be taken largely as a threat to the Union Pacific, with which the St. Paul interchanges Pacific coast traffic at Omaha, in retaliation for an attempt on the part of the Union Pacific to lower the St. Paul's share of the through rate. The threat apparently had its desired

effect, for it appeared that satisfactory arrangements were made with the Harriman line and the new stock issue has for the years since been held in the treasury. Under the announcement made on Thursday of last week, there is to be issued to the stockholders at par $24,802,809 of the new stock, which will cover perhaps a year's work on the new extension. Within that time the road would have the opportunity, on improvement of the market for bonds, to make a large issue covering all future needs, or at the end of that time would be in an equally strong position as now to proceed with any plan then desirable. Thus the present issue tides the company over for a period of a year or more in its financial plans. The fact that this amount of stock was readily available and that final decision as to the financing of the new extension could thus be postponed, and not a determination to abandon part of the new project, accounts for the smallness of the new increase in capital.

The Chicago & North-Western has called upon its shareholders to authorize new capital stock which will a little more than double the amount now outstanding by bringing up the capital stock to $200,000,000. The purpose for which this large increase is intended is not specified in the circular, but according to it the stock is to be issued from time to time in the discretion of the directors. The only way now that the management of the North-Western can prove to the public that there is to be no extension of the road to the Pacific Coast, will be not to build any. Denials surely cannot be taken to mean anything. The St. Paul's Pacific extension was again and again flatly denied by the highest officers of the road. Mr. Hughitt's characterization some time ago of the story of a Pacific extension for the North-Western as absurd, gains no strength from the fact that the circulars announcing the new stock increase must have been in the press at the time he characterized the report of a new stock issue also as absurd. Technically, perhaps, he had a ground of escape, because the rumor which he denied coupled the news of the new issue with the plan to buy up the minority shares in the Chicago, St. Paul, Minneapolis & Omaha. The advantage of a through line to the Pacific for a local road like the Chicago & North-Western has often been explained in these columns and attention has been more than once directed to the North-Western's line which is creeping west through Wyoming, being just about to be opened to a point little east of directly north of the eastern line of Utah. Certainly, if a Pacific extension is to be built, a good start has been made in the new Wyoming line. If not to the coast, it is at least more than likely that this line is to be extended westward to a connection with the Harriman lines in Idaho or Utah, thus giving the North-Western a 1,000-mile longer haul on through traffic.

There is another and quite a different connection in which the North-Western's new stock issue is of interest. It will be remembered that the dream of the Wall street enthusiasts which had probably the largest share in the bull market of 1905 was a New York Central-Chicago & North-Western-Union Pacific consolidation, giving a through line, probably under control of Mr. Harriman, from the Atlantic to the Pacific. It is fairly clear that these three roads are not far apart even at the present time. The New York Central and the Chicago & North-Western are, of course, already related through the holdings of the Vanderbilt family, a considerable share of whose holdings are believed to have come into possession of the Standard Oil party, which is so well represented on the Union Pacific directorate. Whether or not such a plan for consolidation is under way we are not prepared to say, but it is interesting to note that within the year the Union Pacific has authorized an increase of $100,000,000 in its preferred stock, yet unissued; the New York Central an increase of $100,000,000 in its common stock, yet unissued; and, on October 18, the Chicago & North-Western will vote on an increase of $100,000,000 in its stock. Each of the three roads in question, therefore, is well supplied with funds for the carrying out of any such plan.

THE BETTERMENT OF RAILROAD COMMISSIONS.

The full platform of the Lincoln Republican party of New Hampshire with what may be styled its specific railroad programme —anti-free pass, full taxation and popular election of the State railroad commission—has come to hand. We note that the movement has the strong support of the Hanover, N. H., *Gazette*, published at the seat of Dartmouth College; that a prominent professor of that institution is an active leader of the new organization; and, we presume, that the historic and venerable college, with her faculty of course acting as individual citizens, is lending her aid to the cause, as is perfectly fit and proper in any movement for civic and economic betterment. Criticism of the New Hampshire railroad commission system and the proposed change coming from so high an academic source lifts the general subject to a fresh, intellectual and, for that matter, practical level. It may fitly serve as a text for discussion of the possible directions for betterment of State railroad commissions in general—a discussion which, while it cannot be in any sense very exhaustive, is very timely in these days when, as it would almost seem in rivalry with the interstate commerce body, the State commissions are showing fresh vigor.

At the annual national meetings of the various state commissions the subject of their co-ordination of powers and functions has been discussed, but without any very visible results save as betterments have passed from one State into another by the slow force of example. The commissions now existing in about three-quarters of the States of the Union are still extremely heterogeneous. In the form of the blanks to be filled there is a sluggish but positive approach to uniformity. But in commission powers, duties and statutory responsibilities State commissions differ, if we may use the sounding metaphor of the Rev. Joe Cook "by celestial diameters." There are commissions of one member and commissions of several members; commissions made strong by statute, but weak in spite of it and commissions made weak by statute, but—now and then—strong in spite of it; commissions partisan and non-partisan, political and non-political; commissions that rush vastly into undue responsibilities and other commissions without higher thought than the lunch hour on the semi-annual observation car. In these days a railroad train in a run of a few hours may pass through as many States each with its varying statutes to be enforced—permissively or otherwise—by different bodies of commissioners. The divergencies of Sunday statutes, often giving special powers to railroad commissions, may be cited as one example. There are others much more important, but too numerous even for curt mention.

Constructive criticism when it fronts the problem of making these divergent commissions homogeneous has no easy task even though that task goes no further than suggestion. One can only follow certain general ideas of policy aimed at the evils to be corrected. In the unifying of State Commission methods the Interstate Commission has, in a purely advisory capacity, done something, and can, if it will, do much more. We should have more confidence, as to this branch of the problem, in the federal body if it were more conservative and less radical. We may at least offer the gentle query whether the federal commission cannot find time, amid rates and rebates, to push so far as may be and along reasonable lines of advice the co-ordination of the State bodies at least so far as local conditions allow.

It goes with the saying that the State commissions which are hampered by weak statutes should be braced into potential energy by positive and fresh legislation. But it is equally true that the purview of subjects in charge of many of the State commissions, particularly at the West, and in less degree at the South, have been most unduly enlarged. When we find single commissions in expansive and rich commonwealths shouldering not only steam and electric lines, but express charges, corporate taxation, warehousing —in one case also the telephones—one may well doubt human capacity for a task which, while nominally carried, can never be really administered. The problems and processes of rail transportation have during the last few years vastly increased, especially if we include in them those of the street railways. Surely in these rapid days of evolution the legal regulation of steam and electric roads alone, even in a small State, challenges the full intelligence of any commission not composed of sinecurists. We are fully aware of the evil custom of many States of increasing commissions merely to add to the dividend of party and political spoils. But, bad as the practice is, that of "overloading" a commission that otherwise might be efficient and, when overloaded, cannot possibly be so, is worse. As a general and broad proposition, with few local exceptions, if any, the limitation of the functions of the State railroad commission to land transportation by steam and electricity, squares with common sense.

There is another limitation more strictly of a legal quality. Many States make the decisions of the railroad commissions in certain important cases final. Hence arise not only litigations resting on questions of common law or constitutionality, but a tendency on the part of commissions, often untrained in law, to an irresponsibility resting on the statute that confers finality. The partial remedy is the explicit statute providing for appeal and judicial review. Denial of such a statute implies lack of confidence of the legislature and the people in their own tribunals and, *per contra*,

its existence drives home responsibility on the State Commission. Let us illustrate the point by an outside case. Not many years ago in one of the New England States the boards of county commissioners, acting as boards of excise, were given final power in granting saloon licenses. Abuse of that power resulted in a new statute giving appeal for both sides—applicants and resistants—to the courts and a decided abatement of the evil. The bearing of such an experience on the question of arbitrary and excessive powers of State railroad commissions is obvious. If stronger light is needed on the subject one may seek it in the recent congressional debates bearing on the judicial review features of the rate bill. The power of State commissions ought, then, to rest on explicit rather than indeterminate statutes, and when the change is compassed we shall at least find the commissions acting with clearer and more responsible conception of law instead of blundering in the morass of "final" jurisprudence.

In the way of minor suggestion for the betterment of State commissions salaries now ranging from $1,500 to $5,000 or more a year should be more nearly equalized with probably about $3,000 as a minimum. The statutory selection of commissioners from certain classes should be abrogated with, possibly, the reservation that one of the commission must be a skilled engineer. Appointive commissions, on the whole, average better, the country through, than the elective bodies; and, spite of the theory of somewhat higher personal responsibility of the single headed commission, the large diversity of commission duties, if well performed, argues in favor of commissions of at least three members. Finally the archaic and strange system prevalent in some states of levying the cost for the commission as a special tax on railroad corporations should end and the commissions, as an added guarantee of independence, be paid directly by the State. But when all the foregoing betterments, major and minor, of what we may call the mechanism of the State railroad commissions come to pass—if they do—the final test is, after all, the *personnel* of the commission itself. There is the *crux* of the whole problem. The mechanism may be good and yet the commission be bad, the mechanism weak—as in Massachusetts—yet the commission the best in the land. The genuine improvement will arrive when the intelligent citizen, under the sway neither of the railroad corporation on the one hand nor demagogism on the other, carries his work beyond the polls demands for the commission men trained, acute, fearless and honest, and when the civic ardor of such reformers as those in New Hampshire becomes an enduring flame and not a flash.

THE HARRIMAN DIVIDENDS.

"The amount credited as the gain by E. H. Harriman alone is placed at not less than $10,000,000 by many brokers."—*Wall Street Journal*, Aug. 17.

By far the most important event of a week unusually rich in financial happenings—notably so for the summer months—was the announcement of dividends on the common stocks of the Union Pacific and the Southern Pacific railroads. The Union Pacific was making returns to its shareholders at the rate of 6 per cent. annually, while no dividend was being paid on Southern Pacific stock. On last Wednesday the boards of directors of the two roads met and, it now appears, authorized action on the dividends by the executive committees. The executive committees met at 3 o'clock Thursday afternoon, but at the close of the meeting those who had supposed that action would be taken on the dividends were disappointed by the bare announcement of the results of the year's operation on the Union Pacific, and, what was of more interest, since on account of the San Francisco disaster or for other reasons no official figures of earnings have been given out for the road since those for the month of February, the Southern Pacific earnings. Following this supposed failure of the directors of the two companies to take action on the dividends, on Friday morning it was announced that a semi-annual dividend of 2½ per cent. had been declared on Southern Pacific common stock and a semi-annual dividend of 5 per cent.—3 per cent. out of the earnings of the railroad and 2 per cent. out of other income—on Union Pacific common. The stock market was immediately thrown into a furore, and with sales for the day amounting to over 2,500,000 shares, then the high record for both this year and last, the price of Union Pacific, which on Wednesday had been 159 and on Thursday, following the failure of the directors to announce action on the dividend, 163, shot up more than 15 points. Southern Pacific at the same time rose from 82 on Thursday to 89 on Friday.

The official statements of earnings of the two roads show clearly that the rate of distribution thus established on the two common stocks is not unreasonably high. The Southern Pacific, with gross earnings of $105,619,114, now takes its place, with the Pennsylvania, as the second hundred-million-dollar-a-year railroad. When it is considered that these earnings, in spite of the San Francisco disaster, in connection with which the road is estimated to have performed one million dollars' worth of service free, are more than $10,000,000 greater than the figure for the preceding year; that net earnings (over $35,000,000) are $5,500,000 larger than in 1905, and that there has been a reconstruction of the road in which it is estimated that more than $150,000,000 has been spent on betterments without any return whatever to the common stockholder, a 5 per cent. annual dividend is seen to be well justified by present earnings. As for the Union Pacific, gross earnings from transportation increased from $59,000,000 in 1905 to $67,000,000, and net earnings from $27,000,000 to $30,000,000, which, considering the wonderfully favorable results achieved in 1905, is surely a notable increase. But when it is considered that with the beginning of 5 per cent. annual payments on Southern Pacific common stock, of which the Union Pacific, through the Oregon Short Line, holds $90,000,000, there is a new annual return of $4,500,000 on its Southern Pacific investment, it is plain that an annual rate of 10 per cent. on Union Pacific common is for the present also justified. There is, then, so far as the earnings of the two roads are concerned, no reason why dividends at these rates should not be paid.

The manner of declaration of these dividends, however, is an instance of wrongful use of corporate power. The natural and fair way to fix such rates of payment is to lead up to them gradually step by step. Annual payments of as little as 2 per cent. might first have been begun on Southern Pacific leading up, as the property and earnings expanded, to the now declared rate of 5 per cent. In this way, without in any way endangering the credit or prosperity of the company, the stockholders could have had their fair share in the growing prosperity of the company. As it is, not only have the common stockholders received no return on their investment for years, but they have been left entirely in the dark as to when it might please the interests in control to give them any return. The attitude of the management, as expressed in the last annual report, was extremely discouraging as to dividends. The same thing is true, in certain respects in greater degree, in the case of the Union Pacific. It has, of course, been known that the company was making large earnings and, as a result of its fortunate investment in stock of the Northern Securities Company, had an immense surplus at its command. The opinion has, however, been allowed to obtain that it was the policy of the company to make only moderate, if any, increases in the dividend rate and to conserve the strength of the central member of the Harriman group against any extension of railroads or control which might be necessary. The dividend rate, up to October, 1905, was 4 per cent.; at that time a semi-annual payment of 2½ per cent. was made and in April of this year by a semi-annual disbursement of 3 per cent. the rate was increased to 6 per cent. annually. In accord with this policy of gradual increases, it was supposed that, since earnings were favorable, the rate of distribution would at the meeting of the directors this week be increased to 7 per cent. annually. Instead of this, the large increase of 4 per cent. a year over the existing rate was made, raising the rate to 10 per cent., the highest amount paid regularly on any unguaranteed railroad stock, with the exception of Delaware, Lackawanna & Western. Thus both dividend declarations suddenly and unexpectedly increased the rate of payment on both stocks far above the amount which could possibly have been expected from the previous attitude and policy of the management. But even if there was an out-and-out change of policy in the executive committee, there was a clear abuse of power in the delayed announcement of the dividend declaration. It is the general custom in a case like this, where advance information is of tremendous value, to announce the result of a meeting at its close, thus giving, as far as possible, a fair chance to every one to act on the news. Instead of announcing the action which had been taken in regard to dividends, a mere statement of earnings of the two companies was given out, thus naturally giving the impression that, as might easily have been possible, action on the dividends had been deferred. It was not until the next morning that the announcement was made of the dividends which had actually been declared.

The practical opportunities presented to the interests in control as a result of the dividend declarations may be summed up in the quotation from the *Wall Street Journal* at the head of this

article. The dividends, it has been officially announced, were decided upon by the executive committees. The executive committees of these two companies, earning together some $172,000,000 a year, are, practically speaking, E. H. Harriman. His absolute control may be illustrated by the fact that a director of the Union Pacific has since stated that the dividends were as much of a surprise to him as to the rest of the financial community, when he learned of them through a news bureau. It is, of course, impossible to prove that Mr. Harriman, or any of Mr. Harriman's friends, made any gains on the stock market in connection with the dividend declaration. But whether they did or did not, it is interesting to observe the possibilities. On May 2, Union Pacific sold at 138½ and on July 12 at 140. A 10 per cent. stock is exceedingly cheap at those prices. Without considering the opportunity which the interests in control had to acquire Union Pacific during 1905 at between 151 and 113, the year's high and low prices, or between 117 and 71 in 1904, the possibilities of profit within the last five weeks, between 140 and 185, around which Union Pacific is now selling, are worth considering. To a prudent soul knowledge of a 16-point rise which is to take place within twenty-four hours furnishes an opportunity hardly to be neglected, and, as a side issue, with equal knowledge beforehand of the event, there were tidy profits to be taken in Southern Pacific stock. The wonderful efficiency of the arrangement from the standpoint of the insider is that, unlike the operations of a corner, which, though it may be successful by its operation in making a high market price for a stock, invariably finds that the process of profit taking depresses the market to an extent sometimes even greater than the boost, here the high prices can be made permanent, for a 10 per cent. stock of an immensely powerful railroad is by no means expensive around 200. As long as a great railroad leader has the chance *and takes it* to make millions of dollars at the expense of his stockholders, who are themselves helpless to foresee the future, depending alone upon his individual will, so long will hostility to corporations be rampant. A peaceful solution of the corporation question can only come when loaded dice are eliminated from corporation management.

The Brotherhood of Trainmen Again.

The action of the Brotherhood of Railroad Trainmen in supporting the management of the New York, New Haven & Hartford against a body of its own members who were on strike was referred to in last week's issue of the *Railroad Gazette*. There has now come to hand the complete circular issued by the brotherhood in connection with the strike of the switchmen at New Haven, and it is worth quoting as a remarkable and wonderfully encouraging exception to the usual course of trade union disputes. Following a telegram sent to the chairman of each local committee on the New Haven system, which was printed in these columns last week, a circular was issued to all members of the brotherhood on the road, signed by two of the Vice Grand Masters of the order and the General Grievance Committee for the system. The following are quotations from the circular.

To All Members of the B. of R. T., Employees of the New York, New Haven and Hartford System:

Dear Sirs and Brothers:—The undersigned officers found that at the time the men struck, and previous thereto, there had been no complaints or grievances presented to any of the officers of the company. Consequently, if there was anything that would justify a strike, the officers of the company were not given an opportunity to correct it. The strike was not even the result of a united and concerted movement among the yardmen. Any knowledge of the impending trouble was confined to about six men who at midnight struck and then went from crew to crew advising them to do likewise, which they did, consequently when the men who worked the shift between 8 a. m. and 4 p. m. reported for work, they found the yard tied up and they were stampeded into striking, and as a result all of the men went on strike except those working in the passenger yard. The Bridgeport yardmen went on strike out of sympathy for New Haven men, but realizing their mistake they returned to work a few hours later. At our meeting with the men, it was admitted their actions were unjustifiable and they regretted their hasty action. Therefore it was unanimously voted to return to work if it was possible to obtain their positions, and they requested us, the General Grievance Committee and a committee of four members, to call on the General Manager and if possible arrange for them to return to work. In accordance therewith we had a meeting with Mr. Higgins, General Manager, who positively declined to reinstate any of the strikers at this time, and called upon us to see that the contract was maintained and our members properly disciplined for their unauthorized action. We told Mr. Higgins without any evasion that the contract would be protected and that we did not believe the men on the system would tolerate or countenance such actions as the New Haven men had taken. We found that some of our members had misrepresented the situation at New Haven and gone to other points on the system endeavoring to prevail upon the members to join in the strike. Therefore in order to acquaint our members with the situation we sent a telegram to the chairman of each local committee stating that the influence of our organization would be thrown on the side of the company. As a result of this telegram, our members understood the situation better and without hesitancy showed a disposition to protect the contract by sending brotherhood men to New Haven to accept positions. This also prevented the company from importing men who might at some future time prove detrimental to our organization.

It is a well-known fact that for some time past a few of the New Haven yardmen have been constantly threatening to strike. Just what for, no one seemed to know. Within the last three years there have been several illegal strikes in the New Haven yard, which were condemned by the Brotherhood of Railroad Trainmen and the members repeatedly warned that such actions could not be longer tolerated, and on the occasion of a recent visit to Elm City Lodge, No. 201, by the Fourth Vice Grand Master, he found a few of the men eager for a strike, and he counseled, advised and instructed them to present their grievances or complaints to the proper officers of the company in accordance with the laws of the brotherhood and not indulge in any wrong actions, because the brotherhood would not tolerate it and would punish those responsible for any violation of the law. The members at this meeting assured him that they would comply with the laws in every respect and take up their complaints in the regular way. This they finally refused to do, and repudiating instructions and their organization, which their action plainly indicates, permitted a few radical individuals to lead them into a strike, thereby jeopardizing their positions and membership in the organization, which action many of the participants deeply regret.

The conduct of our New Haven members is outrageous, and not in keeping with the well defined policy of the brotherhood, or its laws, or in fact the policy of well guided labor organizations. And it is such action that brings to labor organizations condemnation. The Brotherhood of Trainmen has maintained an honest and fearless policy in handling questions between employer and employee, and now that our members have done wrong we are not going to condone it and permit a couple of hundred men to bring censure and reproach upon an organization of 84,000 members, who want to live in peace and harmony with their employer, and handle questions in dispute in an honest and business-like way.

Many of our New Haven members openly assert there is no contract between the New Haven railroad and its men. This is not a fact, as a contract was made by the joint General Grievance Committee of the O. R. C. and B. R. T. on March 31, 1906, and duly signed by the officers representing the railroad and the officers of the committee representing the conductors, train and yardmen, which contains therein this stipulation and agreement: "The rates of pay and rules herein contained constitute an agreement between the New York, New Haven & Hartford Railroad Company and its conductors, trainmen and yardmen, and will not be departed from without first giving thirty (30) days' notice from either party to the other." This should show beyond any question of a doubt that there is a contract which our members are in duty bound to respect and fulfill.

Our New Haven members have violated their obligation and brought disgrace to the organization which will take some time for us to overcome, therefore they must pay the penalty for their transgression which, according to the law, is expulsion. In concluding this statement we wish to say that this should be a very dear lesson to our members and show to them the necessity of complying with the laws of the brotherhood, and keeping inviolate the contract which exists between them and the New York, New Haven & Hartford Railroad, and beware of those who come in your midst condemning the action which the brotherhood has taken.

The third paragraph as outlined above is a remarkable denunciation of members of its own organization by a trade union body. *Outrageous* is a word which we have been accustomed to hear applied by unions to employers. In this case it is directed against members of the organization by the executive officers in control. The honesty and manly attitude of the whole organization in expelling its own members and in supporting its contract agreements with the road is highly notable. The words used should be printed large in the records and meeting places of every trade union in the country, for it sums up the heart of the trade union problem. The average employer is more than willing that his employees should receive a fair rate of pay and would be willing, in most cases, to treat with union bodies on the subject if the past history of unionism were not so filled with instances of bad faith on the part of the labor organizations. The action of the Brotherhood of Trainmen in the New Haven case is an example of the sort of policy which will go far to give the union the power and authority which it should have as representing the real interest of the employee.

Buffalo, Rochester & Pittsburg.

The Buffalo, Rochester & Pittsburg, for the year ended June 30, 1906, operated 568 miles of line, an increase over the previous year of 29 miles, 11 miles of which was new line, and 18, additional trackage rights. Of the total, 348 miles are owned, 94 miles are leased and 126 miles are operated under trackage rights. There are five subsidiary companies controlled, whose mileage is included in this total, the principal of which, the Allegheny & Western, operates 148 miles of line, including trackage rights over which it gives the B., R. & P. entrancee into Pittsburg.

The road is essentially a bituminous coal road, operating in the Indiana, Jefferson and Cambria coal fields of Pennsylvania, and carrying large quantities of coal from this region north to its northern terminals at Buffalo and Rochester. It consequently felt severely the strike of miners along its lines, as a result of which most of its tributary collieries were idle for four months, from April 1st to July 23, 1906. The decrease in coal traffic from this cause is estimated at 1,500,000 tons, representing a loss of some $1,000,000 in gross earnings, and the reduction of a year's total coal traffic which otherwise would have been the largest in the company's history. The decrease in earnings from coal was $646,550, and the year's loss in freight earnings was $467,000, but owing to an increase of about $112,000 in passenger earnings, the loss in total gross earnings was less than $332,000. Operating expenses were at the same time cut down about $500,000, so that the net earnings for the year ($3,270,000) show an actual increase of $168,000. These were obtained from gross earnings of $7,829,000.

There was spent on extraordinary betterments $93,253, on car trusts $59,000, and in construction expenses $241,889, all of which were charged to income. The last sum was part of the year's total of $1,159,885 expenses for additions and betterments; the balance, $917,996, representing principally payments for second track, new lines to mines, additional shops and the new general office building at Rochester opened in June, 1906, was charged to capital account. The largest items among the construction expenditures are $142,000 for yards, buildings, shops and machinery at DuBois, Pa., $75,000 for sidings and yard extensions, $283,000 for the general office building at Rochester, and $411,000 for second track, Ashford, N. Y., to Punxsutawney, Pa. There was on increase during the year of 12 miles of double track owned.

Equipment account was charged with $495,201 for 22 locomotives, 10 passenger cars, 2 combination cars, 1 baggage car, 43 freight cars and 45 service cars, as well as sundry betterments. Of the new cars 29 freight cars and 11 company cars were built at the company's own shops. On account of equipment sold, transferred or destroyed, car trust bonds paid off, and sinking funds of equipment bonds, $432,654 was credited to equipment account, making a decrease in that account for the year of $62,547. Equipment account is charged with the cost when rolling stock is purchased or rebuilt, and credited when rolling stock having been destroyed or sold, operating expenses are charged with the amount.

The revenue tonnage carried was 8,377,375 tons, a decrease of 889,357 tons, or 9.6 per cent. from 1905. The decrease in bituminous coal alone amounted to 1,029,823 tons, but there was an increase of 143,925 tons in general merchandise. Both train loading and engine loading again show an increase over any previous year. Train load, following an increase of 66 tons in 1905, increased 18 tons more, being 525 tons for 1906. The engine load was 357 tons in 1904, 374 tons in 1905 and 418 tons in 1906. The number of revenue tons carried has increased from 3,775,504 in 1896 to 8,377,375 in 1906, and the freight revenue from $2,595,678 in 1896 to 6,305,187 last year. At the same time the ton mile rate has risen from 0.478 cents to 0.508 cents, and the profit per ton mile from 0.154 cents to 0.216 cents. It is evident that the Buffalo, Rochester & Pittsburg has greatly benefited from the stability in the bituminous coal trade.

No detailed figures are given for the operating expense accounts, but as a whole maintenance of way increased $6,961 and general expenses $175,000, while maintenance of equipment decreased $215,039 and conducting transportation $291,797. The percentage of conducting transportation to gross earnings was 33.29 per cent., against 35.51 per cent. in 1905. The total operating ratio was 58.23 per cent., against 61.99 per cent. in 1905, owing partly to the fact that owing to the light traffic during the coal strike repairs to rolling stock and other work could be done more economically than usually.

A step taken during the year toward extension of the company's influence has been an arrangement with the Grand Trunk by which the two companies have jointly organized the Ontario Car Ferry Co., Ltd., which is to operate a car ferry from Charlotte, N. Y., the lake port of Rochester, across Lake Ontario to Port Hope or Coburg, Ont. This will serve as a further outlet for the company's coal tonnage, and it is also anticipated that considerable general traffic and some passenger traffic will be interchanged. A car ferry with a capacity of 25 loaded cars is now being built by the Canadian Ship Building Company, of Toronto, and is to be delivered within a year. The following are the principal statistics of the year's operation:

	1905.	1906.
Mileage worked	568	538
Passenger earnings	$1,154,089	$1,042,241
Freight earnings	6,603,112	7,070,150
Gross earnings	7,829,452	8,161,080
Maint. way and structures	683,158	676,198
Maint. of equipment	1,099,368	1,314,407
Conducting transportation	2,606,693	2,898,490
Operating expenses	4,559,113	5,058,813
Net earnings	3,270,339	3,102,267

NEW PUBLICATIONS.

The Analysis and Softening of Boiler Feed Water. By Edmund Wehrenfennig, in collaboration with Fritz Wehrenfennig. Translated by D. W. Patterson. New York: John Wiley & Sons. 200 pages; 6 in. x 9 in. 171 illustrations. Price, $4.00.

The author of this book is a mechanical engineer and the chief inspector of the Austrian Northwestern Railway, and his collaborator is an analytical chemist, and director of factories in Eggenberg. The result of their collaboration is a book that should prove of great value to the chemist or water commissioner upon whom rests the responsibility for the selection and purification of the waters to be used in locomotive boilers. It is not a book for the layman, but is essentially a chemical treatise on water purification and demands a knowledge of chemistry in order that it may be read or even studied intelligently. The earlier chapters are occupied with a discussion of the subject from this point of view. Starting with the impurities of water it first shows how water becomes impregnated with impurities, and then the methods by which they can be removed.

Minute details are given as to the analysis of waters, to which a preliminary caution is added to the effect that "the analysis of water for scale-forming matter, of determining the total hardness, the permanent and temporary hardness, the lime and manganese contents, may be obtained by the engineer himself with the aid of this treatise; the determination of the corrosive matter, on the other hand, must continue to be turned over to the chemical laboratory."

Throughout, the book is naturally tinged with Austrian practice and Austrian water is used as examples of practice, a natural result of the sources from which the information is drawn and which does not detract from the value of the book to any chemist.

While other methods of purification such as filtration and heating are touched upon and described, the main stress is put upon chemical purification. The subject is handled in detail, showing not only the quantities and nature of the reagents that are to be used, but the way in which they act and the methods to be followed in their application. The principles of water purification is set forth by means of diagrammatic apparatus, and this is followed by brief descriptions of the appliances in actual service. The brevity with which each is treated is such that only a general idea of the details are obtained, and but just enough to indicate the sources of more precise and special information. The book closes with a long chapter on the installation and management of water purifying plants that can well serve as a guide for any one engaged in such work.

Executive Officers and Directors of American Railways. A group plate suitable for framing, published by William Ten Eyck Hardenbrook, 288 Fifth Avenue, New York. Edition limited to 200 impressions. Price, $50.

As may be judged from the title, a very full collection is given of excellent portraits of American railroad executive officers and directors. The work has been well done and the result is to all intents and purposes an artist's proof of much excellence. As a current record of the personnel of the departments which it covers in the year 1906 it could hardly be surpassed, and will, no doubt, find its way to the wall of many a president's office. Many, if not most of the men shown on the plate, are so busy making a record for themselves and for their companies in this era of great railroad and industrial prosperity in the United States that they have scarcely had time to view themselves and their neighbors in a historic light. The value of this collection, therefore, may fairly be expected to increase year by year, as the older men in the group drop out and younger ones take their places.

CONTRIBUTIONS

Reminiscences of the Great Northern.

Binghamton, N. Y., Aug. 15, 1906.

To the Editor of the Railroad Gazette:

When reading the interesting article entitled "Diamond Jubilee of the Great Northern Railway," appearing on page 117 of your impression of 10th inst., I was pleasantly reminded of my youthful days, which were spent in the neighborhood of the London end of the railroad in question.

I send you herewith a pencil sketch of a tunnel and a photo-

graph of one of the historical locomotives of the Great Northern Railway.

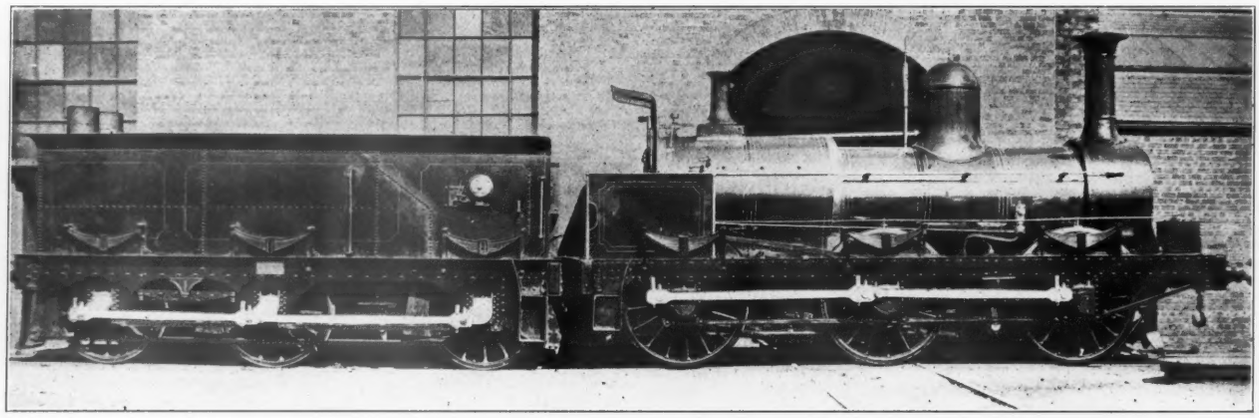
The sketch is one of many made during my rambles in the northern outskirts of London, which at that time were noted for their beauty, but now, doubtless, they are covered with bricks and mortar. The tunnel shown is near Barnet, and was sketched near its northern entrance. I was told at the time that this tunnel was built by Robert Stephenson, but think it possible my informant was in error.

This is one of the seven tunnels within 12 miles of King's Cross, cut in the London clay, as stated in Mr. Paley's article. It will be noticed in the drawing that the left-hand bank was shored up by heavy balks of timber, probably to prevent slipping of the clayey soil. The box-like structure on the right is a "plate-layer's hut," the usual form of section men's shelter in those days. It was made of old ties and rough boards, the roof being covered with earth, which produced an abundant crop of grass and weeds in the summer time. The tall signals need no description, except that they were manually operated.

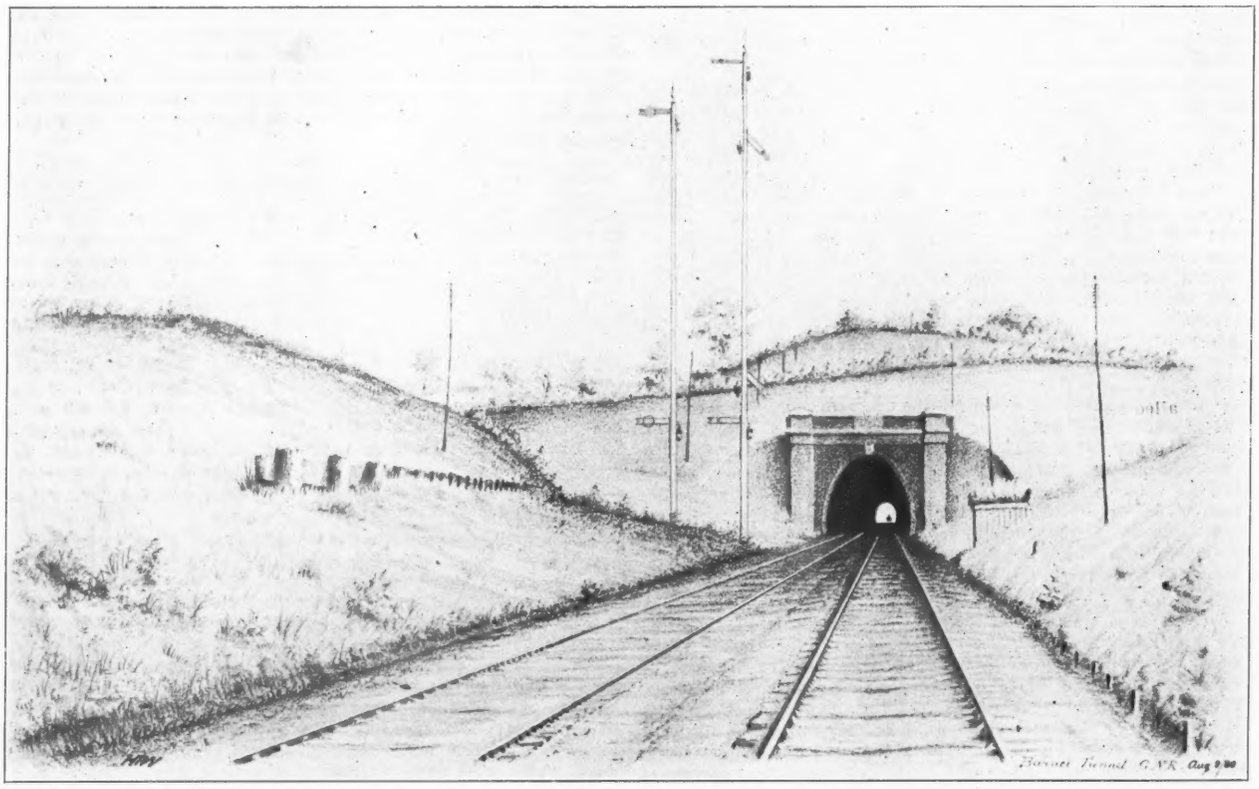
The sketch is of interest, as it shows a part of the Great Northern as originally built. It probably looks very different now since the road has been widened. The drawing is almost as accurate as a photograph, as I measured the principal objects with a pair of compasses, held at arm's length.

As far as I remember, the early locomotives of this railroad were of no special interest, except Mr. Archibald Sturrock's steam tender freight engines. A photograph of one of these, given to me by Mr. Sturrock, is here presented. The middle axle of the tender wheels was cranked and driven by a pair of inside cylinders 12 inches diameter by 17 inches stroke, located between the leading and middle axle. These cylinders drew their steam by a flexible pipe from the main engine boiler which was made extra large for the purpose. The exhaust steam was delivered into a tubular condenser surrounded by the water in the tank, and what remained uncondensed passed away through two short outlet pipes at the rear of the tender as seen in the photograph. The tender wheels were coupled, and it thus made a second locomotive of considerable power, weighing about 37 tons. I saw many of these steam tender engines at work, their long trains being very noticeable, as they sometimes hauled 60 wagons, the ordinary trains consisting of only about 35 wagons; in fact, the trains were too long to handle with convenience, as their length exceeded that of many of the side tracks, and on down grades they were difficult to control with the miserable braking power of the period.

These engines were put in service about 1865, but they did not last many years, for they were, in a sense, in advance of their time, and their repair bills were found to be heavy, as the working parts of the tender caught the dust and grit from the engine.



Archibald Sturrock's Steam Tender Engine, Great Northern Railway, 1865.



Barnet Tunnel (North Entrance), Great Northern Railway, 1880.

Furthermore, the engine men complained that they had practically two engines to care for instead of one, and their disfavor doubtless contributed to the want of success of these tenders, which, as Zerah Colburn says, "deserve to be remembered as a contribution to the practice of auxiliary power." HERBERT T. WALKER.

The New Standard Code.

BY H. W. FORMAN.

(*Continued from page 136.*)

USE OF SIGNALS.

27. A signal imperfectly displayed, or the absence of a signal at a place where one is usually shown, must be regarded as a stop signal, and the fact reported to the Superintendent.

28. A combined green and white signal may be used to stop a train at flag stations indicated on its schedule. Should a combined green and white signal not be available at a point where a train is required to stop on signal to receive passengers or freight, a signal given by any means must be respected.

When it is necessary to stop a train at a point that is not a flag station for it, a red signal must be used.

29. A stop signal given by a flagman by hand must be acknowledged by Rule 14 (*g*).

Except as prescribed by Rule 14 (*h*) or (*n*), a stop, caution or proceed signal given by a fixed signal, flag-stop signal, air-whistle, bell-cord, torpedoes, fusees, or lamps or flags placed on or near the track, will not be acknowledged by whistle.

If necessary to call for the clearing of a fixed signal, use the bell.

32. The unnecessary use of either the whistle or bell is prohibited. They will be used only as prescribed by rule or law, or to prevent accident.

In passing or being passed by passenger trains, as far as practicable avoid using the whistle in such manner as to annoy passengers.

MOVEMENT OF TRAINS.

82. Time-table schedules, unless fulfilled, are in effect until twelve hours after their leaving time at each station.

Where only leaving time is given, regular trains lose their schedule and their train orders become void when they are twelve hours behind such time at any station; where arriving and leaving time are given, they lose their schedule and their train orders become void when they are twelve hours behind their arriving time if at that time they have failed to arrive; and they can thereafter proceed only as authorized by train order.

83. A train must not leave its initial station on any division, or a junction, or pass from double to single track, until it has been ascertained whether all trains due, which are superior, or of the same class, have arrived or left.

A train must not leave its initial station on any division without a Clearance Card, Form A.

84. A train must not start until the proper signal is given.

A freight train must not go through any station without its engineman receiving a "proceed" signal from the rear end, except when weather conditions prevent such signal from being seen.

85. When a train of one schedule is on the time of another schedule of the same class in the same direction, it may proceed on its own schedule, except that a train scheduled to be passed by another of the same class must not go beyond the passing point in advance of the train which is to pass it, unless directed by train order to do so.

Trains of one schedule may pass trains of another schedule of the same class, and extras may pass and run ahead of extras and class trains.

86. A train failing to clear the main track by the time required by rule or order must be protected as prescribed by Rule 99.

87. Inferior trains must keep out of the way of superior trains in the opposite direction, clearing their time as required by rule, and in meeting them must, when practicable, pull into the siding at the initial switch. If necessary to pass this point to pull in or to back in, the train must first be protected, as prescribed by Rule 99, unless otherwise provided.

At meeting points between extra trains, the extra in the inferior time-table direction must take siding in the same manner, unless otherwise provided.

Inferior trains must clear the time of superior trains in the same direction at least five minutes, and as prescribed by Rule 91.

Extra trains must clear the time of regular trains at least five minutes, except as prescribed by Rules 85 and 91.

88. At meeting points between trains of the same class, the inferior train must clear the main track at least ——— minutes before the leaving time of the superior train.

89. At meeting points between trains of different classes, the inferior train must clear the main track at least five minutes before the leaving time of the superior train.

90. Trains must stop clear of the switch used by the train to be met in going on the siding.

Until all overdue trains of the same class have been met, the superior train must approach all stations under control, except where there is an unobstructed view from both directions, and the track is seen to be clear.

When trains run in company, all stations must be approached carefully and a proper outlook kept for the train ahead, but this in no way relieves the preceding train from protecting as the circumstances may require.

91. Passenger trains in the same direction must keep at least ten minutes apart, and no train may precede or follow such trains closer than ten minutes, unless some form of block signal is used.

All other trains must keep at least five minutes apart, except in closing up at stations, unless some form of block signal is used.

91 (*a*). Where the block system is not in effect operators will keep trains the required distance apart by displaying the train order signal at stop after the rear of a train has reached a point three hundred feet beyond such signal.

92. A train must not arrive at a station in advance of its schedule arriving time, except to properly clear at schedule meeting and passing points.

A first-class train must not arrive at a station where only the leaving time is shown, more than five minutes in advance of such time.

A train must not leave a station in advance of its schedule leaving time.

94. A train which overtakes another train so disabled that it cannot proceed, will pass it, if practicable, and if necessary will assume the identity and take the train orders of the disabled train, proceed to the next open telegraph office, and there report to the train despatcher. The disabled train will assume the identity and take the train orders of the last train with which it has exchanged, and will when able proceed to and report from the next open telegraph office.

95. A train must not display signals for a following section unless directed by train order to do so, except that at certain stations designated on the time-table operators may, over the initials of the chief train despatcher, authorize trains to run in sections. Such instructions shall be written in manifold on white paper, and must be signed by the conductor, who will deliver a copy to each of his enginemen.

Each section of a schedule has equal time-table authority.

96. When signals displayed for a section are taken down at any point before that section arrives, the conductor will, if there be no other provision, arrange in writing with the operator, or, if there be no operator, with the switchtender, or, in the absence of both, with a flagman left there for the purpose, to notify all opposing trains that the section for which the signals displayed has not arrived.

The employee thus arranged with must at once display stop signal and allow no opposing train to pass without the required notice until the section for which signals were displayed has arrived.

When practicable, train despatchers should advise opposing interested trains before they reach the station where signals were taken down.

99. When a train stops or is delayed, under circumstances in which it may be overtaken by another train, the flagman must go back immediately with stop signals a sufficient distance to insure full protection, at which point he must place two torpedoes on the rail, two rail lengths apart. He may then return to such distance from his train as will admit of a stop signal being observed by an approaching train in time to prevent collision, where he will place one torpedo on the rail. When recalled, he may return to his train, first removing the single torpedo.

If, while returning to his train, flagman should hear or see a train approaching, he must go back and make every effort to stop it in time to prevent accident.

Should a train be seen approaching before flagman has been able to get back the required distance, he must place one torpedo on the rail if engineman fails to acknowledge his other stop signals before reaching him.

When a train is flagged, the engineman must obtain a thorough explanation of the cause, stopping if necessary.

The front of a train must be protected in the same way by the front brakeman. If the front brakeman is unable to go, the fireman must go.

99 (*a*). On double track, when a train crosses over to or obstructs the other track, unless otherwise provided, it must first be protected, as prescribed by Rule 99, in both directions on that track.

101. If a train parts, care must be taken to prevent damage to the detached portions. The signals prescribed by Rules 12 (*d*) and 14 (*f*) must be given.

The detached portion must not be moved or passed until the front portion comes back.

102. Special instructions may be issued by proper authority, and must be observed, whether in conflict with the Book of Rules or not. Should a bulletin notice be issued conflicting with either the Book of Rules or special instructions, such bulletin will govern.

Bulletins will be posted from time to time in books provided for that purpose at designated points. Conductors, enginemen and ——— must examine bulletins before starting on each trip, and acknowledge notice by signing their names in the places provided therefor.

104. Switches must be left in proper position after having been used. Conductors are responsible for the position of the switches used by their trains, except where switchtenders are stationed.

A switch must not be left turned from its normal position for a following train, unless a trainman of such train is at the switch and has taken charge of it.

Unless there be ample time to do so without risk of accident, do not attempt to throw switch until the train has stopped. Do not remain within twenty feet of the switch-stand while a train is passing over the switch.

104 (*a*). When a train backs in on a siding to be met or passed by another train, the engineman, when engine is in to clear, must see that the switch is set for the main track.

Enginemen must know that derails and other switches are properly set before passing over them.

After locking a switch jerk the chain to insure that the switch is locked, and see that the points are up.

106. Run no risks; in case of doubt take the safe side.

MOVEMENT BY TRAIN ORDERS.

204. Train orders must be addressed to those who are to execute them, naming the place at which each is to receive his copy. Those for a train must be addressed to the conductor and engineman, and also to any one who acts as its pilot. A copy for each person addressed must be supplied by the operator.

Orders addressed to operators restricting trains must be respected by conductors and enginemen the same as if addressed to them.

205. Each train order must be written in full in a book provided for the purpose at the office of the train dispatcher; and with it recorded the names of those who have signed for the order; the time and the signals which show when and from what offices the order was repeated; the responses transmitted; and the train dispatcher's initials. These records must be made at once, and never from memory or memoranda.

206. Regular trains will be designated in train orders by their numbers, as "No. 10," or "Second No. 10," adding engine numbers when practicable and necessary, to further identify trains. Extra trains will be designated by engine numbers, and the direction as "Extra 20, 'North' or 'South.'" Other numbers and time will be stated as illustrated by the train order examples.

NOTE.—Typewriters may be used for copying train orders if type similar to standard large Roman is used. Orders should be punctuated as transmitted by the train dispatcher, and indicated by the examples. Only the copy retained by operator may be underscored. Figures must stand out boldly and not be run together or surrounded by circles.

207. To transmit a train order, the signal "31" or "19" must be given to each office addressed, the number of copies being stated, if more or less than three—thus, "31 copy 5," or "19 copy 2."

208. A train order to be sent to two or more offices must be transmitted simultaneously to as many of them as practicable.

The several addresses must be in the order of superiority of trains, and when practicable must include the operator at the meeting or waiting point, each office taking its proper address.

When not sent simultaneously to all, the order must be sent first to the superior train.

Copies of the order addressed to the operator at the meeting or waiting point must be delivered to all trains affected until all have arrived from one direction, when, if not also addressed to trains in the opposite direction, or there are no other orders in effect at that station, the train order signal must be changed to "proceed."

209. Operators receiving train orders must write them in manifold during transmission, and if they cannot at one writing make the requisite number of copies, must trace others from one of the copies first made. Additional orders made by tracing must be compared with a copy which was transmitted by the train dispatcher.

210. When a "31" train order has been transmitted, operators must (unless otherwise directed) repeat it at once from the manifold copy in the succession in which the several offices have been addressed, and then write the time of repetition on the order. Each operator receiving the order should observe whether the others repeat correctly.

Those to whom the order is addressed, except enginemen, must read it aloud to the operator, and then sign it, and the operator will send their signatures preceded by the number of the order to the train dispatcher. The response "complete," and the time will then be given by the train dispatcher. Each operator receiving this response will then write on each copy the word "complete," the time, and his last name in full, and then deliver a copy to each person addressed, except enginemen. The copy for each engineman will be delivered to him personally by conductor or brakeman.

211. When a "19" train order has been transmitted, operators must (unless otherwise directed) repeat it at once from the manifold copy in the succession in which the several offices have been addressed. Each operator receiving the order should observe whether the others repeat correctly. When the order has been repeated correctly by an operator, the response "complete," and the time, will be given by the train dispatcher. The operator receiving this response will then write on each copy the word "complete," the time, and his last name in full, and personally deliver a copy to each person addressed without taking his signature. But when delivery to engineman will take the operator from the immediate vicinity of his office, the engineman's copy will be delivered by conductor or brakeman.

When a "19" train order restricting the superiority of a train is issued for it at the point where such superiority is restricted, the train must be brought to a stop before delivery of the order.

NOTE.—The "19" form of train order must not be used to restrict a superior train for an inferior train in the opposite direction, unless sent to

the operator at the meeting or waiting point and issued for the superior train before it reaches such station.

211 (*a*). Operators must furnish conductors and enginemen a Clearance Card, Form A, with all train orders.

On passenger trains, conductors must show all train orders to flagmen, and enginemen must show to firemen. On other trains, conductors must show to rear brakemen, and enginemen must show to firemen and front brakemen.

Each engineman must receive copies of all train orders, but only the leading engine of a train need be referred to in train orders.*

215. The operator who receives and delivers a train order must preserve a copy.

218. When a train is named in a train order by its schedule number alone, all sections of that schedule are included, and each must have copies delivered to it. Sections should be specified when practicable.

When sections are not specified, operators who are to deliver orders to them must be advised as to the number running on the schedule.

NOTE TO RULE 219.—In case a train order signal be at stop when a train arrives at a station, operators may continue to accept orders for the train after the engine has passed by such signal, the same as if it had not, provided they do not change the signal. There would be no objection to adding the words "at proceed" after the word "signal" in the fourth line but there seems to be no necessity therefor.

220. Train orders once in effect continue so until fulfilled, superseded or annulled. Any part of an order specifying a particular movement may be either superseded or annulled.

Orders, or any part of an order, held by, issued for, or relating to a regular train, become void when such train loses its schedule as prescribed by Rules 4 and 82, or is annulled.

221. A fixed signal must be used at each train-order office, which shall indicate "stop" when trains are to be stopped for train orders. When there are no orders the signal must indicate "proceed."

When an operator receives the address of an order he must immediately display the "stop signal," and before repeating or "X-ing" the order must reply "stop displayed," adding the direction; and until the order has been delivered, annulled or becomes void the signal must not be restored to "proceed." While "stop" is indicated, trains must not proceed without a Clearance Card, Form A.

Operators must have the proper appliances for hand signaling ready for immediate use if the fixed signal should fail to work properly. If a signal is not displayed at a night office, trains which have not been notified must stop and ascertain the cause, and report the facts to the Superintendent from the next open telegraph office.

When the semaphore is used, the arm indicates "stop" when horizontal and "proceed" when parallel with the post.†

222. Operators will promptly record and report to the train dispatcher the time of arrival and departure of trains, and the direction of extra trains.

At points where train registers are provided, the signals registered by sections must be reported.

GOVERNING PRINCIPLES RELATING TO TRAIN ORDERS.

250. The word "meet" is positive in meaning and cannot be qualified. A train is not met until its markers arrive, or their absence is accounted for. Unless met, do not leave the designated place of meeting until the train has lost its schedule, as prescribed by Rules 4 and 82; or is annulled; or the meeting order is annulled; or another order is received against the train in which the words "instead of" appear.

251. When necessary to direct superior trains to take the siding for inferior trains, the instructions must be given specifically for each meeting point in each order; otherwise, the superior trains will hold the main track.

252. It is not necessary to receive the annulment of a train more than once for the date and between the points named in the order annulling it.

253. The identity of a train must be made known at stations by the men in charge of the train, except when a train register or other circumstance gives such positive evidence of its arrival as to leave no doubt whatever. Ordinarily engine numbers may be depended upon to identify trains, but when Rule 94 is considered, it will be seen that care must be exercised. Also, do not be misled by the fact that the rules require orders to be addressed in duplicate to the operator at the meeting or waiting point: While the order-signal at such station may indicate "proceed," a train similar to that directed to be met may be on the siding, and a hand-signal to proceed given, still the train which must be waited for may not have arrived. The train observed may have made that station by time-table authority, or otherwise; the hand-signal may have been given through error, or intended for some other train; the office may not have been open when the meeting point was fixed, or the operator may have failed to display his stop-signal as required. It must be known that the train has arrived.

254. Trains must be governed strictly by the terms of orders addressed to them, bearing in mind that all orders are in effect until fulfilled, superseded or annulled, or they become void. A later order must never be understood as superseding a former order with which it conflicts, unless the words "instead of" are inserted in connection with the movement which it is intended to supersede. When an order has been superseded it becoms void, and cannot again be used. A part of an order may be either superseded or annulled without in any way affecting the remaining instructions contained in such order. An order may in certain particulars qualify another without superseding it, as illustrated by the following example: A work extra is given an order to work until 6:30 p. m., protecting against third-class trains, while the same or a later order may give it right over such trains until 10:30 a. m. Under these instructions the work extra is not required to protect against third-class trains until 10:25 a. m.

255. Operators must not destroy or place on file an order which is addressed to a train while such train exists, unless instructions are given by train order to do so.

Train dispatchers should prevent the delivery of unnecessary orders to a train by annulling such orders after the object for which they were issued has been accomplished.

256. When the last-named station in their running orders is reached, sections and extra trains must pull into the siding at the nearest end if trains are to be met at such station. If no train is due, they may go to the train-order signal on the main track, provided the view is not obstructed and they properly protect against opposing trains which may be coming to that station in the same manner and of which no previous notice was given. When a section or an extra train reaches the end of its then authorized run, or when its authority to run as the train is taken from it, all train orders held by such train thereupon become void and must not again be used. All orders held by work extras become void at the time their working orders expire, or are annulled. Helper-engines lose authority to occupy the main track, and all of their orders become void when they detach from the train they are helping; except in cases where a helper holds separate orders creating it as another train after performing the helper service.

257. A "run-late" order affects the train thus restricted only within the limits named, and right to use the additional time is conferred upon other trains addressed while within such limits, but not beyond. "Run-late" or "wait" orders must be cleared five minutes, and also as prescribed by Rule 91.

258. A regular train may be created at its initial station by a clearance card, but at other points it must be created by train order. When schedule is given to a train by clearance card or otherwise it retains such schedule between the stations mentioned, or, in absence of designation, to the end of its run on that division, unless taken away from it by train order.

259. Orders not in prescribed forms and which are not clear, or will admit of different interpretations, if accepted, must be understood to have no further effect than as holding orders. Be governed by Rule 106 in such cases and clear the train in question as prescribed by rule, if there be any doubt whatever as to authority to move against it.

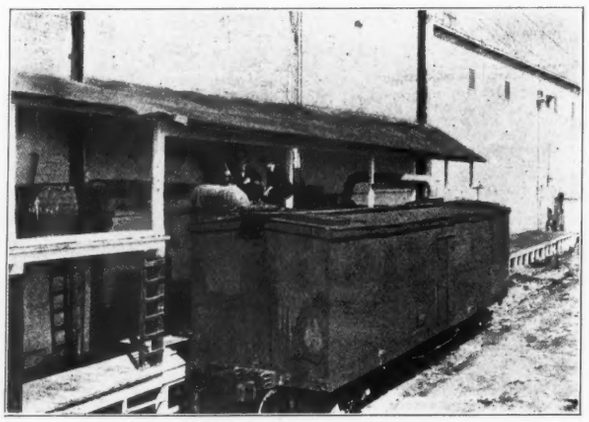
(To be continued.)

*NOTE.—If desired, operators may be directed to deliver enough copies of orders to a train to also supply the fireman and rear brakeman, so they can have a copy to constantly refer to.

†NOTE TO RULE 221.—The code rule requires the order signal to be displayed at "stop" immediately upon receipt of the signal "31" or "19." As several minutes often elapse before the operator is given the address, on account of dispatcher calling other offices, this provision is likely to cause a disinterested train to be held unnecessarily.

Cooling Fruit for Shipment.

The year book of the United States Department of Agriculture for 1905 has a chapter on the handling of fruit for transportation which takes up the recent growth of fruit shipments, the causes of loss in transit, and the present methods of handling. Cool, dry, pure air is held to be the principal factor that favorably influences keeping quality. In this connection is mentioned a system of cooling fruit after being loaded in cars from a cold storage plant by forcing cold air through the fruit in the car. The accompanying photograph shows this method as used by the Los Angeles Ice & Cold Storage Company in cooling oranges for the shipping experiments of the Department of Agriculture. Cold air was blown through a large insulated tube leading from a bunker room in the storage plant to the ice trap in one end of the car. From a trap at the opposite end of the car another tube led back to the warehouse. The cold air was blown into the car at a temperature of 32 deg. Fahr., and after passing through the car was drawn back by an exhaust fan to the warehouse, where the moisture and gases from the fruit were frozen on the refrigerator pipes. The direction of the air current through the car could be changed. With a powerful air current it took from 30 to 50 hours to cool the fruit in the center of the packages to 40 deg. Fahr. A large cold storage plant



Cooling Oranges in Car by Cold Air at Los Angeles.

operated on the same principle has been built at Springfield, Mo., by the St. Louis & San Francisco to cool bananas in cars in transit. This plant consists of four tracks inside a shed, each track holding 10 cars. The same plant may be used in winter to raise the temperature of the fruit when desired.

A Projected Transcontinental Railroad in Australia.

According to *Engineering* there is some likelihood that a north and south railroad will be built across Australia. There are, of course, railroads in the southern part of the continent, the longest north and south line at present being from Adelaide on the southern coast north to Oodnadatta, 688 miles. To carry this line the rest of the way across the continent to Port Darwin on the north coast would require 1,063 miles of new line, which it is estimated would cost about $25,000,000 to build. As the government of this territory is at present rather hard put to it financially and besides has pledged itself to building a line from Port Augusta, which is near Adelaide, to Kalgoorlie in Western Australia, which would cost another $25,000,000, it is not probable that this line will be built as a government venture. As an alternative means of building the government line, the Parliament of South Australia in 1902 passed a Transcontinental Railway Act in order to provide for building the line on the land grant system. Pursuant to the act, tenders were invited for the construction of the line, offering a maximum of 75,000 acres in alternate blocks for each mile of road built. No acceptable tender was, however, submitted, and the whole matter was allowed to drop.

The Northern Territory of South Australia, which occupies the north central part of the continent, has an area of 523,000 square miles, 335,116,800 acres, or approximately one-sixth of the whole Australian continent. It has many safe and spacious harbors and three fine rivers, and is rich in mineral, agricultural and grazing resources. However, although it has been a British possession for more than a hundred years, it has a population of barely 3,000, only about 800 of whom are Europeans. It is believed that railroad communication will open up the country to general settlement.

The N. Y., N. H. & H.'s New Haven Improvement.

New Haven is, so to speak, the throat of the New York, New Haven & Hartford system, for it is here that the through line from New York branches into the wide territory so completely occupied to the eastward. On the eastern edge of the city of New Haven, the Shore Line, which under the present policy has become the most important through line beyond New Haven, the Air Line, now little used, but for which there are important improvement plans under consideration, and the Hartford line, which runs to the important Boston and Albany connection at Springfield, diverge. The Northampton division also leaves the main line at a point about half a mile east of the New Haven station, which is at the eastern side of the city. All traffic, therefore, destined beyond New Haven has to pass through the New Haven cut, which leads through the city to Cedar Hill, about a mile and a half east of the New Haven station and a little way short of the junction point where the three eastern through lines separate.

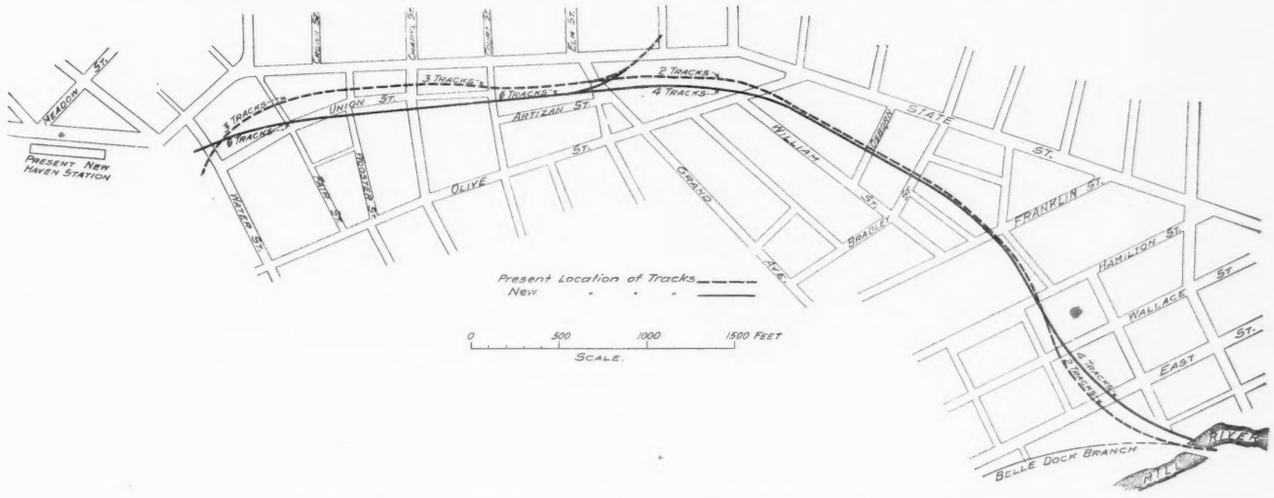
The maximum clearance at present allowed between New Haven and Cedar Hill for any car is 14 ft. 2 in. above top of rail for a maximum width of 7 ft.; 13 ft. above top of rail for a maximum width of 9 ft.; 12 ft. 6 in. above top of rail for a maximum width of 10 ft., and 12 ft. above top of rail for a maximum width of 10 ft. 3 in., which is the maximum width allowed through the cut. Unlike many clearance figures, these clearances really are the maximum for the cut, for at certain points with cars measuring up to maximum clearance the space between the car and the obstructions of the cut is less than 1 inch. These clearance limits are obviously much too small for many cars, both freight and passenger, now in common use. The problem of increasing the capacity of the cut is one which has long been before the New Haven management and with increase in size of cars has become more and more necessary of solution. It is a handicap to the railroad which naturally should have been done away with long ago, but like many other improvements was left to President Mellen to carry out.

It was on April 10, 1904, that the news was published in the New Haven papers that extensive plans were under way for the reconstruction of the railroad cut through the city. Previous to this announcement the road had made large purchases of property necessary for widening the cut. The first plan proposed, which was approved by the Connecticut Railroad Commission, was for widening the cut by paralleling the old tracks with two or more additional tracks between Water street, just east of the New Haven station, and Cedar Hill, at the further end of the cut. When the railroad company announced what it was going to do, there was great outcry in the city of New Haven against permitting the plan to be carried out, on the ground that it would raise the grade of all the streets over the cut, which were already objectionably steep. With this there opened a period of discussion and hostility between the city and the railroad which lasted for considerably over a year.

On the objection of the city to the first plan announced by the railroad, the company, in an endeavor to settle the question in a way satisfactory to both parties, investigated a number of other plans for getting the traffic through New Haven. Five different plans were presented with the understanding that the railroad would carry out any one of these which the city selected. These were, first, the plan already mentioned to parallel the present tracks in the widened cut; second, to follow the present location of the tracks on an elevated structure; third, to shift the tracks north of Water street somewhat to the east and carry Union street, under which they would then run, on a bridge; fourth, to abandon the cut and run east from the New Haven station along the water front parallel to Water street to a junction with the present Belle Dock branch at Belle Dock, thence over the Belle Dock branch to Cedar Hill, this line to be an elevated viaduct east of Belle Dock, and, fifth, a plan for a line on this same new location by way of the water front at Belle Dock, but with the streets carried over instead of under the tracks. The fourth and fifth plans were accompanied by an offer from the railroad company to deed to the city all its holdings in the present cut, if the city would in return provide it with a right of way along Water street (part of this, where the land was already owned, to be contributed by the road), and in addition pay as its share of the work $300,000. This sum the city, under these terms, would be liable for under the State grade crossing act. There were two other plans proposed during the long discussion of the question which were of some slight importance; one to abandon the cut and carry the railroad straight across the city over a new location from the present station to Cedar Hill, and the other to make a new line by filling in a section of the harbor parallel to the water front and making a junction with the Belle Dock branch by this line, which would run outside the docks instead of between the docks and the city as in the fourth and fifth plans.

Of the five plans presented none was satisfactory, for the city refused to set its approval on any one of them. There was, at the same time, much public discussion of the question and a good deal of feeling aroused against the railroad company, some of it unjustly. For example, photographs were published in the local papers which appeared to show that the railroad's original plan for widening the cut would raise the grade of the streets two or three times the amount it really would. As time passed and there seemed to be no likelihood of the city's agreeing to any plan, and as the cut was more and more of an unbearable hindrance to traffic, the railroad management decided to go ahead with the originally announced plan of widening the existing cut for additional tracks. The beginning of work was met by the city with an appeal to the local court for an injunction to prevent the railroad from carrying out its plan. A temporary injunction was granted, which was later upheld by the Superior Court of Connecticut. This suit was brought on May 12, 1905, and the injunction granted on July 6. The appeal of the city was granted on the basis of a provision in the original charter of the New Haven & Northampton Railroad Company, based on an act of the Common Council of the city of New Haven passed on February 14, 1846, granting the privilege of building through the city to the New Haven & Northampton Railroad, now the Northampton division, and at the same time providing that the road should be operated under the regulation of the Common Council.

To understand the legal grounds for the injunction it should be understood that when the company which controlled the old canal connecting New Haven and Northampton failed, the New Haven & Northampton Railroad was organized and built its railroad in the bed of the old canal, where it runs to-day. It enters New Haven from the north, and joins the main line through the cut at Grand avenue, running south through the cut to the water front. Its original station, the foundation walls of which are yet to be torn down for the new cut, was at Chapel street, the main street of the city, two blocks south of Grand avenue. When the Hartford & New Haven Railroad built its line to New Haven from Hartford, Belle Dock was its terminus and the steamers running

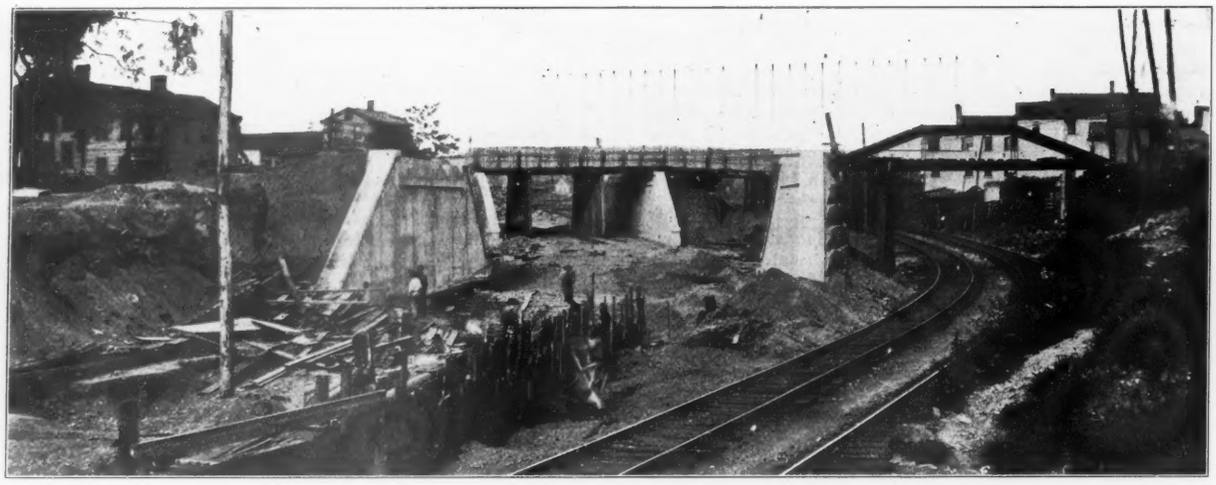


Plan of Old and New Tracks in New Haven Cut—N. Y., N. H. & H.

from there, its New York connection. Later when the New York & New Haven Railroad was built from New York to New Haven, it secured trackage rights over the New Haven & Northampton from the water front north to Chapel street, and also the right to use its station at Chapel street. Soon after, in order to get railroad connection to New York, the Hartford & New Haven company built a line from Cedar Hill on the east side of the city to a connection with the New Haven & Northampton Railroad at Grand avenue, where it enters the cut, the new line being the eastern end of the present cut. Thus the original ownership of the cut was vested in the New Haven & Northampton and the Hartford & New Haven companies. It was on this account that the city was successful in its suit based on the act passed by the city granting to the New Haven & Northampton company the right to build its railroad through the city.

The city's injunction was granted, as already mentioned, on July 6, 1905. During the summer of 1905 there was considerable manœuvering between the city and the railroad, President Mellen at one time stating at a hearing before the State legislature that the road was not compelled to send its traffic through New Haven, and would, if prevented from carrying out its improvement plans there, arrange to send its traffic around New Haven by way of the Naugatuck division, Waterbury and the Highland division. Finally on August 15, a commission, consisting of the Mayor and two aldermen, was appointed to represent the city and confer with President Mellen, the limiting condition being placed on their decision, however, by vote of the Board of Aldermen, that the city must neither be bonded nor put to any expense in carrying out the railroad's improvement work. Through this commission a compromise was, on September 10, made public, under which the terms of which the railroad company is now carrying out the work of widening the cut.

This compromise plan was a modification of the first plan of the road for paralleling the original tracks through the cut. It was, however, more satisfactory to the city because it did not involve increasing the grades of the streets over the cut and to the railroad because it gave more head room and very much better alinement than the original plan. The plan as agreed on by the city and the railroad is shown in a general way on the acompanying sketch map, showing the location of the old and new tracks in the cut. It provides for shifting the tracks some distance east of their present location for more than half of the length of the cut on the southern end and on the eastern half for straightening and shortening the line. The new cut, especially on the southern end, will be much wider than the old one. Union street, which runs parallel to the present tracks as far as Grand avenue, is to be abandoned for most of its length, and its site added to the width of the cut. From Water street to Grand avenue there will be six, and from Grand avenue to Cedar Hill four tracks. In addition, between Water street and Chapel street there will be room for a number of switching and industry tracks next to the property line on the west side of State street. Over these tracks on a viaduct a double track trolley line will carry from Chapel street to the station the electric street cars now running on State street. This carrying of the trolley tracks over the right of way of the



Abutments for Street Bridges on New Alinement at Mill River End of New Haven Improvement—N. Y., N. H. & H.

New Bridge Site at Mill River; Old Bridge Being Torn Down and Temporary Trestle on the Right—New Haven Improvement, N. Y., N. H. & H.

steam road is interesting in connection with the present policy of the road of bringing into closer relation its steam and electric lines.

The compromise plan made it necessary for the road to buy much additional real estate, as the location of the widened cut on the south end ran directly through the wholesale district of the city, and on the east end took in much new property. A number of large buildings, including the Masonic Temple, and most of the wholesale meat houses, were purchased and torn down, as well as a great many smaller buildings. The accompanying photograph shows the cut north from Water street as it appears at present. The ground in the center of the picture was formerly occupied by a number of large wholesale houses. The site of the Masonic Temple is to the right of and beyond the pile driver. The building standing some distance back of the pile driver is on Chapel street. It is now owned by the railroad company, but, although it stands in the middle of the new cut, it will have to be left standing for the present on account of an obstinate lessee. On the left are shown the two present main line tracks, and on the left of them the Northampton division track, with sidings to wholesale houses on the extreme left.

The great problem in planning for the cut, the one which stirred up the trouble with the city, and was in the beginning the compelling cause of undertaking the work, was the necessity of getting more head room above the tracks. In order to get sufficient head room in the original plan it would have been necessary, as was claimed by the city, to raise the present grade of the streets over the tracks, which is about 5 per cent. Under the present plan of widening the southern part of the cut, the street grades in the business section of the city, where steep grades would be particularly objectionable for heavy teaming, can be lowered to 3 per cent. by extending them, that is, by making them longer but the slope more gradual. The reason why it was not possible under the first plan to simply lower the tracks to a level deep enough to give the necessary head room without increasing the grades was that the cut as it now exists is little above high-water level in the Sound. For this reason it was not believed possible to lower the level of the cut, especially because in times of high water and heavy rains the rails are often entirely under water under existing conditions. It has proved to be possible, however, to get 18 ft. instead of 16 ft. head room, without any increase in the street grades. This is to be accomplished by a new drainage system which has been devised under the direction of Mr. E. H. McHenry, Vice-President in charge of engineering. It has been found that the cut is not likely to be flooded by tide water, but that there is a great deal of surface water just below the ground level, which must be carried off. The drainage system is to drain the cut south of Franklin street, nearly three-quarters of its length. North of Franklin street the water will drain directly into Mill river. On the southern part it is arranged that the cut normally drains into the Sound at low water. When the water in the Sound rises above the height of the discharge pipe, it closes a gate at the mouth of the pipe, and the drainage from the cut, instead of flowing out into the Sound, is carried into a concrete sump, which is 15 ft. below high-water level. When the water rises to a certain height in the sump, a centrifugal pump, worked by an electric motor, is set in action by a float, and enough water is pumped out to bring the water in the sump to a safe level. By means of this system of drainage and the widening of the cut the road is

New Haven Cut Looking South from Above Olive Street Showing New Curving Abutment for Olive Street Bridge. Bottom of Old Masonry Abutment, at Left of Present Tracks, Shows Width of Old Cut.

New Haven Cut Looking North from Water Street. Excavated Space in Foreground Was Site of Principal Wholesale Houses of the City; Site of Masonic Temple in Background; Eagles' Building on Chapel Street (Back of Pile Driver) in Center of Excavation at That Point.

enabled to get 18 ft. head room instead of the present 14 ft. 2 in., and at the same time to lower the maximum grade of the streets from 5 per cent. to about 3 per cent.

A good idea of the character of the work on the New Haven improvement can be gained from the photographs. These show clearly the contrast between the old and the new location of the tracks, and the types of concrete walls and abutments which are being built. The conditions of working have been in many respects exceptionally favorable. All materials for the concrete, except the cement, are directly at hand. Sand and gravel are dug out of a bank in the excavation, screened and dumped into the concrete mixture. Stones from the old masonry abutments are swung around by a derrick and dropped into the concrete as keystones, and water for mixing is found in almost every excavation below ground level. South of and including Grand avenue all the streets are to be carried over the railroad on reinforced concrete arch bridges averaging 30 feet to an opening, with two tracks in each opening. North of Grand avenue, truss girder bridges are to be put in. One of the photographs shows the present conditions at Mill river. The old double track arch bridge with four openings is being torn down. On the right is the temporary double-track bridge held on 50-ft. piles, which now carries the traffic. On the left the sheathing is in place to a depth of 16 ft., preparatory to driving piles for the foundation of a new two-span, six-track concrete bridge which is to be built. The solidity of the old construction can be judged from the fact that even after the old keystone had been knocked out, dynamite had to be used to tear down the arch of the old bridge.

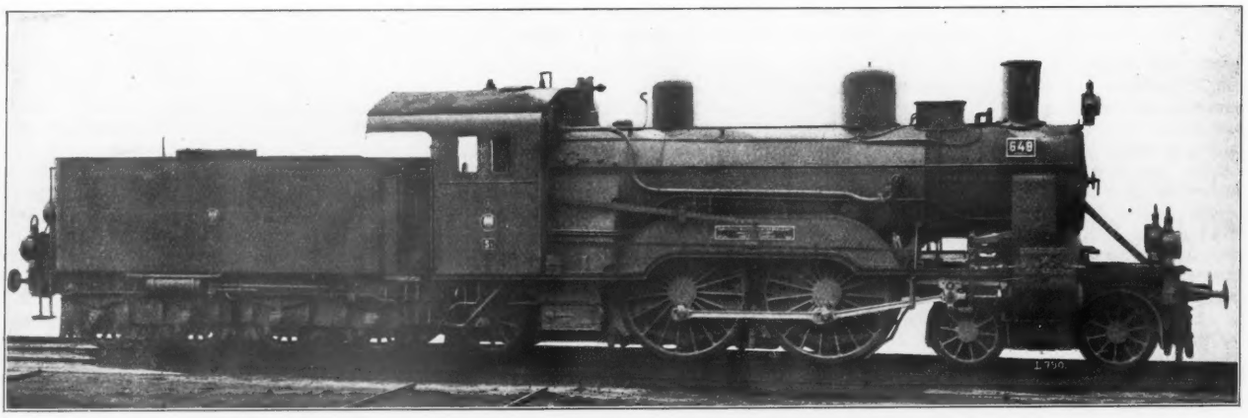
The New Haven improvement is the first case in which concrete has been largely used by the New York, New Haven & Hartford, which has, up to a comparatively recent date, used masonry exclusively. For the work in the cut concrete is cheaper and can be put in place faster, especially because the work has to be done where material is difficult to handle. The comparative costs of concrete and masonry may be shown roughly as follows:
It is estimated that the four-track concrete bridge at Mill river, for instance, will cost only about 60 per cent. as much in concrete as in second-class masonry, and the 16 ft. concrete retaining walls the first of next year. The whole work in all its details will probably require until the summer of 1908. It is estimated that, including cost of property bought, the improvement will cost the railroad between four and five million dollars. Its completion will, however, be of immense value to the road, as it will not only make it possible to take any car through the cut, but, through the additional tracks and facilities provided, will make the whole New Haven system much easier to operate than at present.

Four Cylinder Compound Express Locomotive for the Prussian State Railways.

The Hannoversche Machinenbau Actien Gesellschaft has now built about 140 locomotives of the four-cylinder compound type for the Prussian State Railways. Recently an engine was built and exhibited at the Milan Exposition that was fitted with Lentz's patent valve gear using poppet valves. The general dimensions of the engine are as follows:

Diameter of cylinder	14 3/16"—22"
Stroke of piston	23 5/8"
Diameter of driving wheels	6' 6"
Diameter of trailing wheels	3' 3 3/8"—3' 7"
Coupled wheel base	6' 10 3/4"
Bogie wheel base	6' 6 3/4"
Total wheel base	29' 6 3/8"
Working pressure	200 lbs.
Gate area	29 sq. ft.
Heating surface in fire-box	106 sq. ft.
Heating surface in tubes	2,414 sq. ft.
Total heating surface at fire side	2,520 sq. ft.
Number of tubes (serve)	138
Diameter of tubes (outside)	2 7/8"
Length between tube plates	14' 7 1/4"
Weight empty	56 t 14 cwt.
Weight in working order	61 t
Adhesive weight	29 t 18 cwt.
Capacity for water of tender	4,400 imp. gallons
Capacity for fuel of tender	6 tons
Weight of tender empty	21 t 7 cwt.
Weight of tender in working order	46 t 19 cwt.

Contrary to the usual method of construction, the high-pressure



Atlantic Type 4-Cylinder Compound Locomotive with Lentz Valve Gear; Prussian State Railways.

only about 70 per cent. as much. The concrete mixtures used are: For foundation, 1-3-5; for body, 1-3-5, and for parapets and bridge seats, 1-2-4. Abutments, bridge seats and parapet blocks are all of concrete. There is an expansion joint every 30 ft. in the walls, and two expansion joints in the rings of the arches. A shield inside the form holds the heavy concrete 2 in. away from the outside of the wall. The whole wall is done at once without any seams, and the concrete forms taken off after 36 hours. The outside surface is then gone over with a wash to give a uniform cement color.

Excavation for the cut is almost entirely by steam shovel, for which conditions are ideal, two Marion steam shovels, each with 2½-yard bucket, being used. There are 102 deg. of curvature on the new as against 161 deg. on the old location. One particularly bad curve has been done away with at the eastern end of the work, where a 5-deg. curve reversing into a 7-deg. curve is to be replaced by a 4-deg. curve. Four degrees will be the maximum on the new location. Another curve, at East street, at present averages 7 deg., with 8 deg. maximum. This is to be brought down to 4 degrees. There are 33 deg. of curvature saved on the long tangent from Fair street, the next street north of Water street, to a point north and east of Grand avenue. Between Water street and Cedar Hill the cut intersects 12 city streets, over each of which new bridges are to be built. This work is being done by closing every other street.

It is expected that the eastern part of the cut improvement work from Water street north to Grand avenue will be finished by

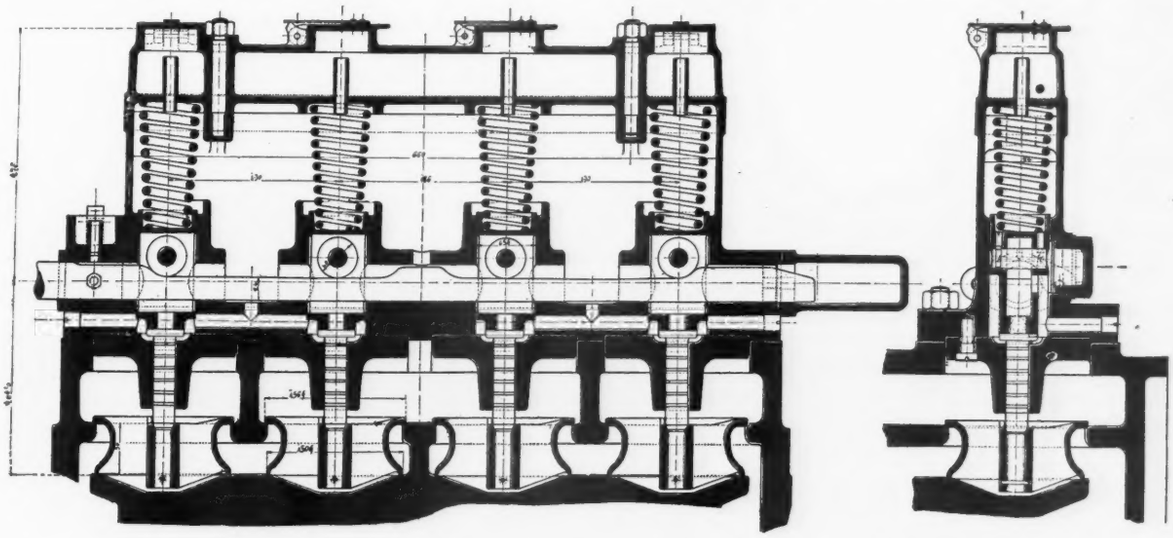
cylinders were placed outside and the low-pressure between the frames, as a better balancing of the engine could thereby be obtained. The cylinders are cast with half saddles so that a high and low-pressure cylinder with the valve chest is contained in a single casting. The four cylinders are thus set across the locomotive on the center line of the leading truck.

The connecting rods for all cylinders are coupled to the forward axle, the cranks of the high and low pressure cylinders on one side being set at 180 deg. to each other, while the cranks of the two high-pressure and of the two low-pressure cylinders are set at an angle of 90 deg. to each other. By this means an almost perfect balancing of the masses of the alternating parts is attained, so that the locomotive is distinguished by extremely steady running even at the highest speeds. During the speed tests held in the year 1905 by the Prussian State Railways on the line between Hanover and Spandau a speed of 90 miles per hour was reached by an empty locomotive of this type. According to the statement of the director of these tests "the locomotive ran so smoothly even at this high speed that the latter might have still been increased without hesitation."

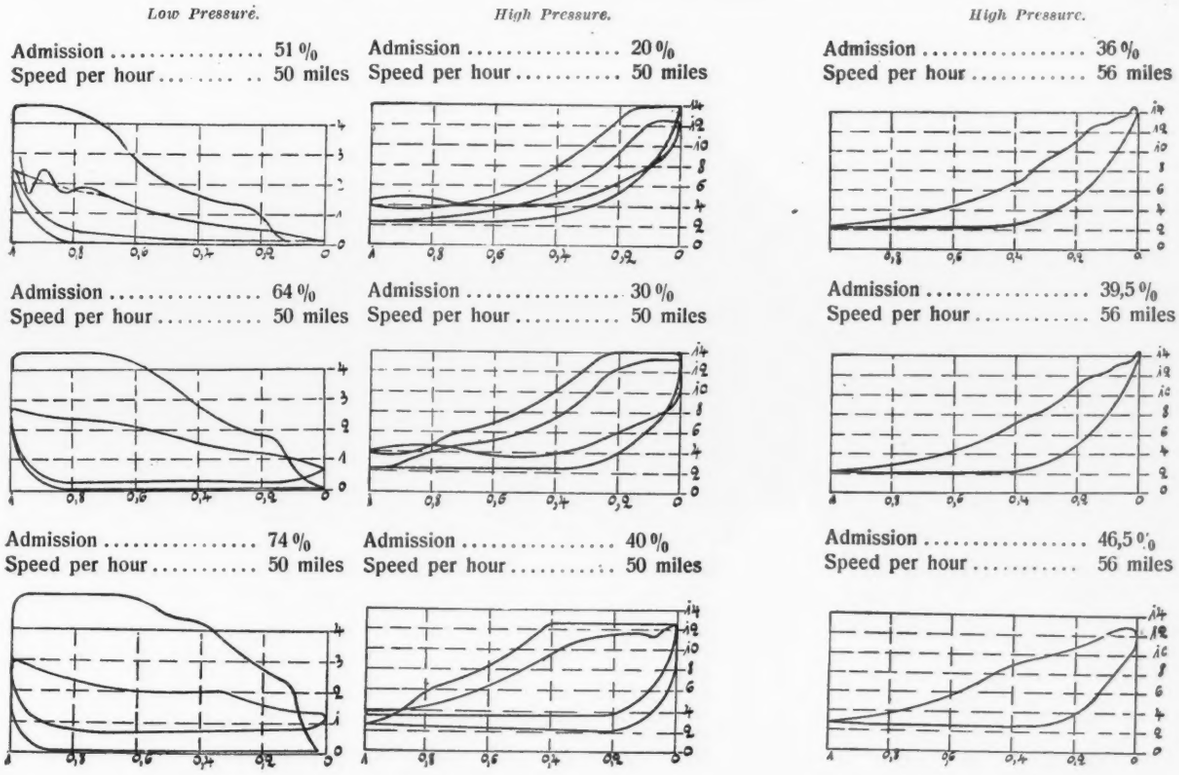
The valve gear is of the Heusinger type, von Borries' patent, in which each pair of slide valves on one side of the engine is driven by a single eccentric between the frames and the motion of the valves for the outside cylinders is taken from that of the neighboring inner cylinder. The valve motion has in principle re-

mained unalterated from the existing construction of this class of locomotive, with the difference that in place of the valve-rod of a high-pressure cylinder, a rod with curved projections for actuating the valves is attached. Some of the dimensions of the distributing valve motion has, of course, been modified, because, as has been explained above, the low-pressure cylinders have been placed inside the frames. The position of the valve motions of the high and low-pressure cylinders towards each other has been so arranged

valve is opened, steam enters by an aperture through a special tube into the receiver. A connecting tube fitted with a return valve is, however, attached to this steam inlet pipe and enters the high-pressure cylinder at the center of the latter. The high-pressure cylinder is consequently still supplied with steam behind the piston even when the poppet-valves have already been cut off. By this means the troublesome counter-pressure of the steam emanating from the receiver and getting in front of the piston is done away



Poppet Valves for 4-Cylinder Compound Locomotive; Prussian State Railways.


Low Pressure.
High Pressure.
High Pressure.
Admission ..... 51 %
Speed per hour ..... 50 miles
Admission ..... 20 %
Speed per hour ..... 50 miles
Admission ..... 36 %
Speed per hour ..... 56 miles
Admission ..... 64 %
Speed per hour ..... 50 miles
Admission ..... 30 %
Speed per hour ..... 50 miles
Admission ..... 39,5 %
Speed per hour ..... 56 miles
Admission ..... 74 %
Speed per hour ..... 50 miles
Admission ..... 40 %
Speed per hour ..... 50 miles
Admission ..... 46,5 %
Speed per hour ..... 56 miles
with Poppet valve distributing gear.
with slide valve distributing gear.

Indicator Diagrams from Four-Cylinder Balanced Compound, Locomotive of the Prussian State Railways.

by suitable dimensions of the transmitting lever that a steam admission of 40 per cent. in the high-pressure cylinder corresponds to an admission of 74 per cent. in the low-pressure cylinder. The greatest admission in the high-pressure cylinder is 68 per cent., that in the low-pressure cylinder 89 to 90 per cent.

For starting, the oldest well-known starting device, von Borries' system, has been chosen. The working of this is as follows: The throttle-valve has two flat valves, one on top of the other, after the Continental style. As soon as the small regulating slide

with. The locomotive therefore always starts with the low-pressure cylinders, without the high-pressure pistons being able to exercise a counter-pressure. This starting mechanism has splendidly stood the test of a 14 days' trial to which it was submitted before being sent to Milan. During these trials the locomotive started unhesitatingly, even with the heaviest loads without giving the least trouble even once out of 500 to 600 attempts.

The illustrations show the arrangement of the valve-gear for the high-pressure cylinders. The four valves, two for the inlet

towards the center and two for the outlet towards the ends lie in a plane and are worked by means of the rod with lifting projections already mentioned.

An exact calculation of the degrees of acceleration pressure arising shows that comparatively weak springs suffice to promptly close the valves, which weigh less than 10 lbs., even at 300 to 350 revolutions. One of the most important advantages of this valve motion is that it reduces the speed of the steam while passing through the admission. Diagrams of this velocity of the steam, taken with the point of cut-off at about 40 per cent. of the stroke which can be taken as being about normal, shows that the rate of flow is about 40 per cent. less than with the ordinary valve gear which gives less wire drawing during admission.

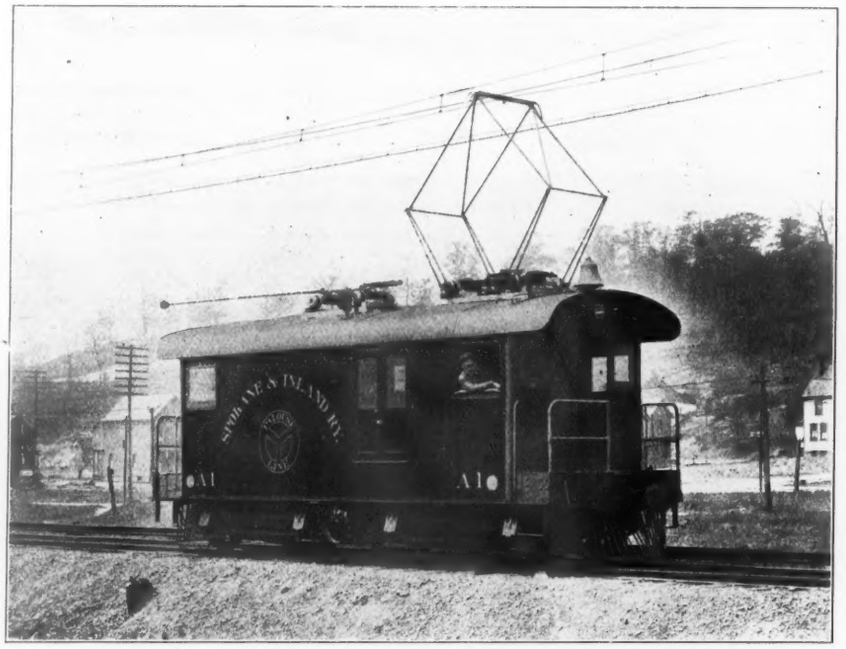
The indicator diagrams shown, which seem to substantiate this claim, were taken when the locomotive with poppet-valve motion was running at a speed of 50 miles per hour and for the sake of comparison a series of diagrams taken at the testing plant of the St. Louis Exposition on the same locomotive fitted with slide-valve motion are added.

The Spokane & Inland Electric Railroad.

Some months ago announcement was made of a new single-phase railroad called the Spokane & Inland, which was projected to run between Spokane, Wash., and several neighboring cities. The road was originally incorporated under the name of the Spokane Interurban System, with a capital of $3,500,000, the incorporators being local capitalists. The principal terminal of the road is Spokane, from which the line runs south through Waverly, Rosalia and Thornton to Colfax, which is the southern terminus at present, although the line has been surveyed and will eventually be extended to Penawawa, Wash., or Lewiston, Idaho. A branch leaves the main line midway between Spokane and Colfax, and runs to Palouse City. The Y-shaped system between Spokane, Colfax and Palouse City covers about 106 miles in length. The roadway and overhead construction have already been finished.

The country traversed by this road, which now has no railroads, produces large quantities of wheat and fruit. The road is receiving the hearty support of the farmers along its route. There are three classes of service to be maintained—passenger, mail and express, and car-load freight.

The Westinghouse single-phase, alternating current system has been adopted for the operation of the road. Six electric locomotives, six express cars and 15 passenger cars have been ordered. Power from the Washington Water Power Company is to be used for operation, to be delivered in a 4,000-volt, three-phase current of 7,200 alternations to a frequency-changing station about 10 miles south of Spokane. The 2,200-volt, 25-cycle current is stepped up to 45,000 volts, and at this pressure is transmitted to 15 static transformer sub-stations. Each sub-station is equipped with two transformers which step down the current from 45,000 volts to 6,600 volts, which is the trolley line voltage. The cars and locomotives operate under three different potentials; 6,600 volts on alternating current in the country, 700 volts on alternating current in the small towns, and 600 volts on direct current in the city of Spokane.



Spokane & Inland Electric Locomotive Operating on Alternating Current.

The trolley line is of the Westinghouse standard catenary construction. The electrical equipment of both passenger and express cars is identical and consists of four Westinghouse 100 h.p., alternating-current railroad motors per car. The schedule speed is to be from 35 to 40 m.p.h. The locomotives are equipped with the same type of motors, but the latter are each of 150 h.p. capacity. Both the motor cars and the locomotives are operated on the Westinghouse multiple-unit control system. The locomotives, one of which, operating on alternating-current, is shown in the accompanying photograph, are designed to handle a general carload freight business, and are capable of hauling seven standard freight cars fully loaded at about 30 m.p.h. on a level track. The cab of the locomotive serves to enclose the auxiliary apparatus and is constructed entirely of steel. Its total weight is 49 tons, and its length over bumpers is 29 ft. It has two swivel trucks with 38-in. driving wheels. Two motors are mounted on each truck and are geared to the axles. Both straight and automatic air-brakes are used, the compressed air for which is supplied by two Westinghouse compressors, each driven by a 5 h.p. single-phase motor.

The cars of the Spokane & Inland enter Spokane over the tracks of the Spokane Traction Company, which operates a 600-volt, direct-current system, and this requires the use of both direct and alternating-current on the interurban cars. The only mechanical operation in changing from alternating-current to direct-current is to change the trolleys, an ordinary wheel trolley pole instead of the pantagraph trolley being used on direct-current. The two trolleys are shown in the illustration. The control is changed automatically by the commutating switch, which is a small pneumatically operated drum for shifting the control circuits.

Another Open Letter from President Ripley.

Following his first letter to the people of Kansas, protesting against a reduction of passenger fares in Kansas, published on page 125 of the *Railroad Gazette* of August 10, President Ripley of the Atchison, Topeka & Santa Fe has written the following letter, dated August 21:

To the People of Kansas:

Since the publication of my first letter I have received a very large number of communications, of which about one-half are in approval, one-quarter in criticism, and the rest asking for information. Finding it out of the question to answer each letter, I have decided to answer all at once so far as is practicable. Those who take issue with the first letter mainly dwell on these points:

1. Alleged over-capitalization.
2. The taxation of railway property.
3. The issue of free passes.
4. The alleged interference of the railroad in politics.

As to the first: I stated that the Santa Fe was worth all it is capitalized for. I am asked if the stockholders who bought the stock ten years ago at, say, $13 a share, have not made money. Of course they have, but has that anything to do with the case? They had courage enough to buy an interest in a discredited concern, just emerging from bankruptcy—only a few had the courage to do it. The great bulk of our common stock was held by those who owned it when the bankruptcy occurred; who held it throughout the receivership and who paid an assessment of $10 per share in cash in order to keep it. How about those people, most of whom paid par or more for the stock in the '80's, and who not only got no returns between 1889 and 1899, but paid an assessment besides?

Among the letters received is one from which I quote as follows:

"On March 11, 1889, I bought Santa Fe stock, paying $55 for each share. On July 11, 1895, I paid on each share of stock a cash assessment of $10. Fifty-five dollars, with interest at six per cent. compounded annually for seventeen years, amounts to $147.95, and ten dollars compounded at the same rate for eleven years amounts to $18.90. And there has been no time in the last seventeen years that I could not compound at that rate semi-annually instead of annually. My stock should to-day represent to me $166.85 per share. I have received on each share dividends to the amount of $21.50. Deducting this from the above amount would leave each share standing me at $145.35. The stock is selling at 93, and I am a loser

of $53.35 on each share. And yet, according to the (Topeka) Capital, because stock sold at 13 eight years ago, I am not a loser at all, but am a gainer by 300 per cent. No doubt but that most of the stockholders stand about in the same position I do."

The above letter is from a citizen of Kansas whom I do not know and never heard of before, but he was fortunate in only having paid $55 per share—many of the present stockholders paid $120. I repeat that, whether we consider what the property has cost (including in the cost the interest on investment), or whether we consider its reproduction value, it is not over-capitalized.

Second, taxation: The Santa Fe desires to pay its fair share of the taxes levied for the support of the state; it will not be heard to murmur so long as its property is assessed at the some proportion of its real value as is the property of other citizens; there is no reason why it should be favored in this respect on the one hand or oppressed on the other. (I may say that, in my opinion, a strict and honest application of this principle would considerably reduce the taxes we now pay.)

Third, as to passes: It is almost universal custom in every part of the country to transport free of charge national, state and county officers; it was originally meant as a courtesy, and I have never felt that it gave the railroad any claim on the conscience of the official receiving it, nor have I known of any case where a legislator has voted or been expected to vote against his convictions because of holding a pass. If the people of Kansas desire that this courtesy shall cease to be extended to their officers, there will be no objection raised by this company. But the prohibition of passes to other than railway employees will not materially increase the passenger receipts.

Fourth, the railroad in politics: We have the same interest in good government as has any other citizen and the same right to display that interest. As the largest corporation in the state and the largest taxpayer, we have a vital interest in sane and conservative legislation—and when (as has too often been the case) there is danger that the state will be swept off its feet by appeal to passion and prejudice made by designing demagogues for their own personal ends, it becomes a duty to oppose those men by fair and legal means —in such cases, and in such cases only, will the Santa Fe be found in politics. Individual employees are unrestricted; they may hold and express such views as they think proper, but their action is not to be taken as that of the company, nor is the latter responsible for their political opinions or utterances.

I realize fully that such prosperity as the Santa Fe has enjoyed is due largely to the energy and thrift of the Kansas people, but they should also recognize that we have done our share. Each is necessary to the welfare of the other; and if, in the last decade, there has been any good work done in the state, or for the state, in which the Santa Fe has failed to do its part, and more than its part, I am much mistaken. (Signed)) E. P. RIPLEY.

Chicago, Aug. 21, 1906. President A., T. & S. F. Ry. Co.

The First Railroad Owned and Operated by a Government.

BY C. H. CARUTHERS.

Few of the passengers who are carried each day in the luxurious and smooth-running trains of the Pennsylvania Railroad between Philadelphia and Lancaster, Pa., realize that they are traveling upon a line which was put into operation at a date very close to the triumphal success of Stephenson's Rocket at Rainhill on March 24, 1829, and was the first railroad of any country in which ownership and control were vested in the state; yet this is the case, and such ownership and control prevailed upon the portion of the road referred to for a period of at least 25 years.

In the early half of the nineteenth century, business men and others realized that some more rapid and efficient means of transportation than the Conestoga wagon, the pack-horse, and the stage-coach was needed to meet the demands of the traffic between Pittsburg and Philadelphia. Hence the plan of building a railroad from Philadelphia to Columbia, a canal from Columbia to Hollidaysburg, a railroad from Hollidaysburg to Johnstown, and a canal from Johnstown to Pittsburg was decided upon, and the work was undertaken by the state of Pennsylvania.

The Philadelphia & Columbia Railroad formed the first part of this chain of improvements and was completed very early in the thirties. It was designed as a double-track road from the beginning, and was unique in owning no cars except a few for use in the maintenance of way, as it appears to have been the idea of the officials that a railroad was to be classed as a turnpike, and each person using it must provide his own vehicles.

Both freight and passenger trains were drawn at first by horses and mules, and even after the first locomotives had been brought from England and placed on the road, many of the animals were retained in service, especially on passenger trains, as the lack of experience of most of the enginemen and firemen, together with the possible incompetence of a number, rendered the service of these engines somewhat uncertain and unsatisfactory. No record which has ever come under the writer's notice shows state ownership of equine motive power, hence it is reasonable to suppose that until the advent of the locomotive each carrier furnished his own horses or mules, as on the turnpike and canal.

The first track used was of longitudinal stringers laid in two parallel lines, and resting on crossties. The top of each stringer was surmounted with flat bars of iron fastened in place by spikes with heads fitted in countersunk holes. These bars formed the rails upon which the cars ran, and soon developed a very disagreeable trait of becoming loose at their ends and catching against the wheels, which in turn sent them skimming up through the floors of the cars. Numerous injuries to passengers resulted from this cause, and some unfortunately proved fatal. These loose ends were known to the trainmen as "snake-heads." Just when this type of track was superseded by iron rails is not quite certain, but it was evidently very close to the change of power from animals to steam, as in the eleventh annual report of the Pennsylvania Railroad, dated Feb. 5, 1858 (the first report after the acquirement by the company of the properties of the Commonwealth), the statement appears in the report of the Resident Engineer of the Philadelphia division (as the Philadelphia & Columbia Railroad was renamed by its new owner) that 6,000 ft. of iron west of Dillerville had been renewed and that the old iron which was taken up was of "edge rail" type and had been laid in 1834 and used regularly from that date until the time of its removal! Some of the sidings owned by private parties along the line retained old patterns of rails and attachments for a still longer period. Such a siding remained at Gordonville station as late as 1862, and had a light form of T rail set in chairs on stone blocks; and at its connection with a secondary siding, no frog was used, but a section of rail, about 6 ft. in length, was pivoted at its center, and could be swung to either line of rails as desired. It was held in working position by a pin passing through the plate underneath it at one end. All bridges crossing streams of any size were of wood, and in some instances built with the track passing through their girders instead of on the top. An inclined plane was used for a time at Columbia, and another at Philadelphia opposite Peters Island, about where the Columbia bridge now stands. It is stated that after the locomotives came on the road they occasionally ran up this latter incline unattached to the pulling rope, but were not able to take any cars with them until the "Washington," built by William Norris in 1836 with 10 in. x 18 in. cylinders, 48 in. drivers and weighing seven tons, surprised railroad men everywhere by drawing, unaided in any way, a maximum load of 19,200 lbs., at a speed of 15 miles per hour up this incline, which was 2,800 ft. long and had a gradient of 7.1 per cent.

With the exception of that portion from the west end of the Conestoga bridge to Columbia, comparatively little of the present line follows the exact course of the state road and is often at a considerable distance from it, and many abandoned sections of the old line can still be seen with the ballast grass-grown, and yawning gaps where bridges formerly crossed streams or highways. Even the track between Conestoga bridge and a point about two miles west of Lancaster, although on the same ground which the state road occupied, is not on the route of the original survey. This followed what is now known as the Lancaster cut-off, but was abandoned before any track was laid, in favor of the present route with its objectionable curves, grades and grade crossings, and was only utilized by the Pennsylvania within recent years.

From Philadelphia to Lancaster the original course was decidedly serpentine in character, and the reason assigned for this by those who knew the road was that many farmers of that day realized the benefit of having the road pass through or near to their properties and threatened a withdrawal of their support from the politicians in charge of the work if the line was not built as close as possible to their farms. Probably another reason was that it was thought desirable to keep near to the old Lancaster pike and thus not merely be located in a more densely populated region, but also be better able to secure much freight and passenger traffic which otherwise would probably have continued to follow the ancient road. As one result of the route selected, a number of well-known "wagon taverns" became equally well-known as railroad eating houses, for the dining car was yet a long way off, and the slow speed of the trains, combined with some irregularity of schedule, gave frequent occasion to stop for meals (and it is whispered that the bars were also well patronized, not by the traveling public alone, but also by the employees and even the officers of the railroad company)! An old employee has informed the writer that at first a train required two days to make the run between Columbia and Philadelphia, stopping at Parkesburg over night, yet the entire distance is but 80 miles; and this man further informed me that during an effort to shovel out a stalled train from drifting snow, a high official soon ordered a discontinuance of the work, saying it was "useless for a railroad to fight against the elements." Another of his reminiscences referred to a summer of the long ago when grasshoppers were unusually numerous and alighted on the

rails in such numbers that the "sandboxless" engines of the time were quickly stalled by the oily matter left upon the rails as the wheels crushed them on the line. One part of the road near Lancaster was so especially affected by the cicada hosts that it bore the name of Grasshopper Level for many years.

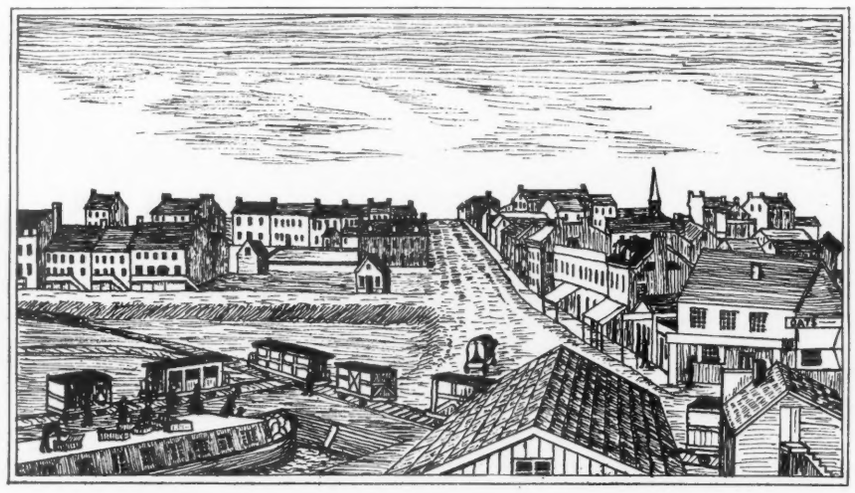
I have no authentic data to indicate whether the original starting point for passenger trains was at the foot of the Peters Island incline or not, but if so it was no doubt extended to a more convenient part of the city at a very early date. It will be noticed that the old advertisement accompanying this article places it at Eighth and Market streets in 1850, and in the eighth annual report of the Pennsylvania Railroad Company, which covers the year 1854, allusion is made to the opening of its new passenger station at Eleventh and Market streets on May 20th, of that year, and of the completion of the roof of its new freight station at Thirteenth and Market streets on December 15th, of the same year. Hence it would appear that the hauling of passengers had at that time, to a large extent, if not entirely, passed into the hands of the Pennsylvania, and this is further confirmed by a statement in the same report that the company "owns 34 passenger cars for use on the Philadelphia & Columbia Railroad."

Although trains began running on each section of the road as rapidly as it was completed between 1831 and 1834, the formal opening did not take place until the latter year, when one track was finished between Philadelphia and Columbia. This event was then celebrated by running two trains of passengers from terminal to terminal. Each train consisted of 10 four-wheel cars, and each car carried 16 passengers.

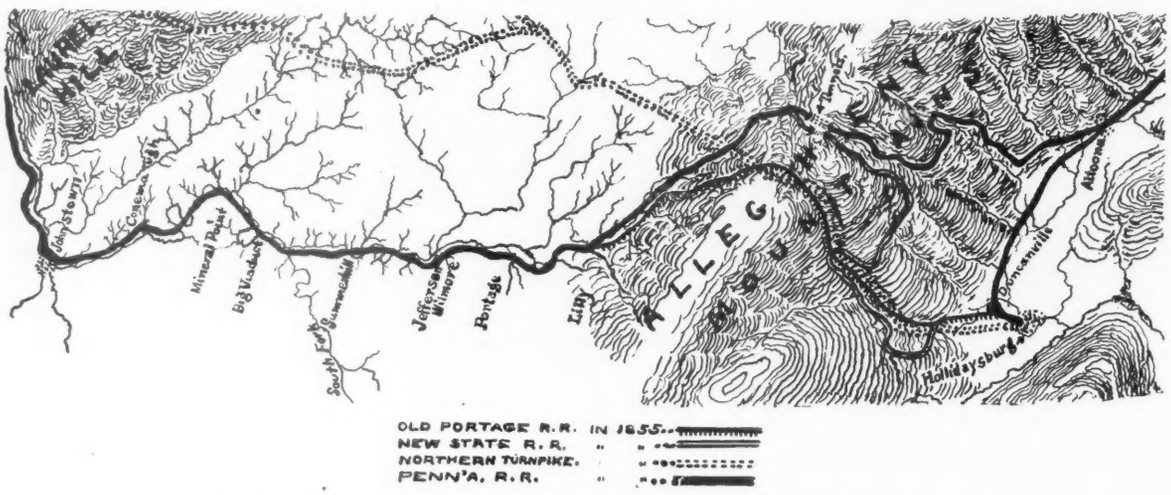
According to the "Guide to the Pennsylvania Railroad," published in 1855, which also includes a description of the Philadelphia & Columbia road, there were 29 stations between Philadelphia and Columbia, and a comparison of this list with a schedule of to-day will reveal some remarkable changes, especially between Coatesville and Philadelphia. Many of the old stations have been abandoned and many new ones opened. Some of the original stations are retained, but the names have been changed. From Philadelphia westward, Hestonville is replaced by Fifty-second street; Libertyville by Overbrook; Bryn Mawr replaces White Hall, whose old turnpike tavern, which was also used as the station house, still stands about one-half mile to the southwest on the abandoned part of the old line, and only Haverford, Villa Nova, Paoli, Green Tree, Downingtown, Gallagherville and Caln remain of the original names. The "Guide" mentions Midway, and alludes to Coatesville as a "small village to the left," but this small village has now crept close to the line and substituted its own name for that of Midway. From Coatesville to Columbia there has been much less change. Pomeroy probably takes the place of Chandler, and two miles further on, Parkesburg remains as of yore, but without the shops which the state had erected there for repairing its equipment; and beyond this the old village of Penningtonville has long been known as Atglen. Of the rest of the 13 stations which in 1855 existed on this part of the road, eight yet preserve their names, and one has been abandoned. Several new ones have likewise been added to the list.

The "Guide" also contains a statement that at the time of beginning the construction of the state railroad, the strip of land 40 miles wide which it bisects in its course between Philadelphia and Columbia, containing 1,740,800 acres, was worth about $50,000,000; but by 1855 had increased in value to $85,000,000, and attributes this to the increased opportunities brought to its owners by the railroad.

It has already been said that the state furnished the locomotive equipment used on the road, and although the engines of English manufacture were the earliest placed in service, the first authentic matter at my command is contained in the records of the Baldwin Locomotive Works. It is there stated that M. W. Baldwin's third locomotive was built in 1834, was named "Lancaster," was placed upon the Philadelphia & Columbia road on June 25, 1834, and was followed by nine more built of approximately the same design for the same company, and late in 1835 these were followed by another engine for the road on somewhat different lines. It was Mr. Baldwin's 18th engine, was named "Brandywine," and was of the outside connected type. Its chief dimensions were: Cylinders, 10 in. x 18 in.; driving wheels, 54 in. diameter; weight, 20,000 lbs., of which probably 12,000 lbs. were on the drivers. In later years the "Brandywine" was partially remodeled by the addition of another pair of driving wheels, and was retired from service in 1858.



Hollidaysburg, Pennsylvania, in 1843.

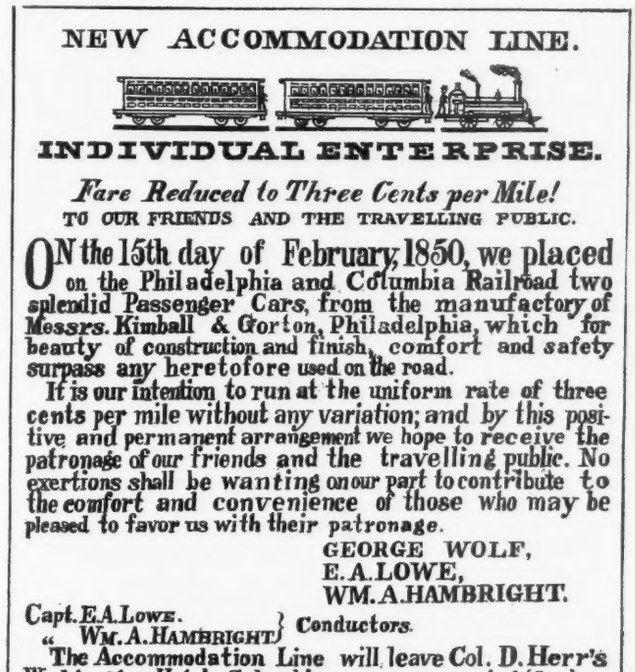


Allegheny Portage and New State Railroads from Hollidaysburg and Johnstown.

At least six engines built by William Norris of the type shown in the drawing of the "William Penn," an enlarged form of the "Washington," were placed on the road between 1836 and 1845. Several of these were yet in existence at the time of its purchase by the Pennsylvania Railroad, but with the exception of the "William Penn," all were cut up immediately after passing into the hands of their new owner. The "William Penn" was sold to the Strasburg Railroad, a private line connecting the town of Strasburg, Pa., with the Pennsylvania at Leaman Place station. It remained in service there until about 1864, when it again came into

the hands of its builders, the Norrisses, and was later partly rebuilt by them at their new shops in the old plant of the Lancaster Locomotive Works at Lancaster, Pa., receiving a square firebox and a cylindrical dome instead of the original horse-shoe box and hay-stack dome. The hook-motion valve-gear was retained, also the original tender. The engine was then taken east, loaded on a vessel, and taken via Cape Horn to San Francisco, Cal., and placed in the service of the Southern Pacific Railway, or at least of a road which afterward became a part of that system. The illustration shows it as it appeared in a photograph taken in 1897 by Mr. H. Frazer, of the Westinghouse Air-Brake Company. At that time it stood among debris in the sheds connected with an abandoned ironworks in San Francisco, and was yet in running order, although it had not been used for a year or two. The writer has no data at hand as to whether it is still in existence.

From at least half a dozen of old employees, and others who had been connected with the road, it is ascertained definitely that among the first engines were at least three of English manufacture, on lines similar to the "John Bull" now preserved in the National Museum in Washington City, D. C. These three were named "John Bull," "Red Rover" and "Hawkeye." Two Winan's engines, the one a "Crab" and the other a "Grasshopper," also rendered efficient service for a time; and an Eastwick & Harri-



NEW ACCOMMODATION LINE.

INDIVIDUAL ENTERPRISE.

Fare Reduced to Three Cents per Mile!

TO OUR FRIENDS AND THE TRAVELLING PUBLIC.

ON the 15th day of February, 1850, we placed on the Philadelphia and Columbia Railroad two splendid Passenger Cars, from the manufactory of Messrs. Kimball & Gorton, Philadelphia, which for beauty of construction and finish, comfort and safety surpass any heretofore used on the road.

It is our intention to run at the uniform rate of three cents per mile without any variation; and by this positive and permanent arrangement we hope to receive the patronage of our friends and the travelling public. No exertions shall be wanting on our part to contribute to the comfort and convenience of those who may be pleased to favor us with their patronage.

GEORGE WOLF,
E. A. LOWE,
WM. A. HAMBRIGHT.

Capt. E. A. LOWE. } Conductors.
" WM. A. HAMBRIGHT }

The Accommodation Line will leave Col. D. Herr's Washington Hotel, Columbia, every morning (Sundays excepted) at 8 o'clock, Lancaster at 9 o'clock, and arrive at Philadelphia at 1½ o'clock. Will leave corner of Eighth and Market streets, Philadelphia, every morning at 11 o'clock, arrive at Lancaster at 4, and Columbia at 4½ o'clock. may 25 1850-tf

Philadelphia & Columbia Announcement, 1850.

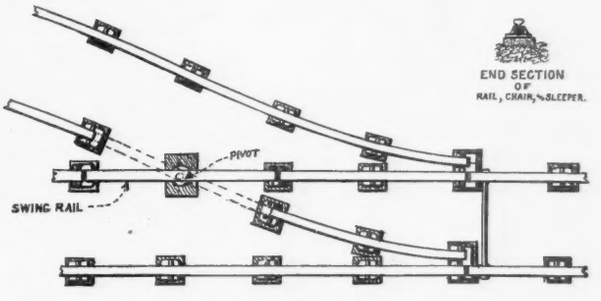
son contributed to the kaleidoscopic character of the equipment. None of the engines referred to thus far were provided with sand-boxes, headlights, cabs or cowcatchers; and the cylinder cocks as well as the try-cocks of the pumps, could only be reached when running, by the engineman creeping to them along the frame. All used wood except the "Crab" and the "Grasshopper." This soon led to placing spark-arresters on the original straight stacks, and this gave them somewhat the appearance of the Diamond stack in use to some extent to-day, but some of the bridges being found too low to permit the engines with this increased height of stack to pass through, a new form was devised in which the diamond containing the cone and netting was placed directly on the top of the smoke-box and carried the straight portion upon its top, to which it was attached by a hinge and coiled spring, which enabled it to be easily raised to an upright position. A rod from its top to the foot-plate enabled the engineman to control it.

The engine crews early learned that sand increased the adhesion of their machines to a wet or dirty rail, and began to carry it in pails or wooden boxes on their engines, and from these it was sprinkled on the track by hand when needed.

But few of the engines had more than one safety-valve. The lever was attached to a spring-balance, and the adjustment was entirely under control of the engineman. Although the maximum pressure carried was not intended to exceed 100 lbs., the men often tried to obtain better results by screwing the valve down to a higher pressure, and of course explosions "occasionally" took place.

During 1845 two six-wheel conneted Baldwin engines without trucks came into service, and were followed between that period and 1850 by 15 eight-wheel (four driving wheels connected) engines from the works of Norris Brothers, the successors to William Norris. These engines ranged in weight from 38,000 lbs. to 40,800 lbs., of which from 12,400 lbs. to 20,000 lbs. were on the driving wheels. The cylinders ranged from 11 in. x 26 in. to 13 in. x 24 in., and the driving wheels of all but two were 54 in. in diameter. The two exceptions had 48-in. wheels. The valve-gear was of the "V" hook type, with independent half-stroke cut-off. On two of the engines this cut-off was driven from the crosshead. The fireboxes were of horse-shoe pattern, and were surmounted by a large wrought-iron haystack dome, which was in turn surmounted by a small dome of polished brass. Most of these engines remained in service from eight to ten years after coming into possession of the Pennsylvania Railroad.

In 1853 the first engine bought by the state from the Lancaster Locomotive Works of J. Brandt, at Lancaster, Pa., came on the road, and during the ensuing three years 26 more of substantially the same design were furnished by Mr. Brandt. Those designed for passenger service had driving wheels 66 in. in diameter, and those for freight service were built with but 60 in. wheels. In other respects all were very much alike, having wagon-top boilers with two domes, one on the waist and the other on the roof-sheet, steam chests sloping both laterally and crosswise, Stephenson link motion, French & Baird wood-burning stacks, slide throttle valves placed on the smoke-box end of the dry-pipe with a tallow cup for their lubrication on the top of the smoke arch, profuse ornamentation in brass and vermilion, tender trucks with journals and frames inside of the wheels, and altogether in a number of respects bore



Old Swing Rail Frog and Edge Rail Switch, at Gordonville, Pa., in 1862.

an exceedingly close resemblance to many modern passenger locomotives. Their dimensions varied considerably, the cylinders ranging from 16 in. x 20 in. to 18 in. x 22 in.; the total weight from 53,000 lbs. to 60,000 lbs., and the weight on drivers from 31,800 lbs. to 35,500 lbs. All were altered to coal burners by the Pennsylvania. A considerable number of these Lancaster engines remained in active service as late as 1876 and 1877, and one ran an accommodation train between Columbia and Lancaster regularly until late in 1883.

The only other locomotives owned by the state at the time its improvements passed into the possession of the Pennsylvania were two built at the works of the New Jersey Manufacturing Co., also under control of Mr. Brandt, which were quite similar to the Lancaster engines; six eight-wheelers (four driving wheels connected) from R. Norris & Son; two eight-wheel (four drivers connected) Baldwin engines bought in 1854 from the Pennsylvania Railroad, and two of similar design but somewhat lighter built by M. W. Baldwin, all of which were used on the Philadelphia & Columbia Railroad; and six Norris Brothers engines of same type as the 15 already mentioned; two Smith & Perkins eight-wheelers (six drivers connected); three Baldwin ten-wheelers (six drivers connected), and four R. Norris & Son ten-wheelers (six drivers connected), all of which were in use on the Allegheny Portage Railroad. Many of these were considered large engines at that time and for several years after, and were later rebuilt at Altoona and used in some of the most exacting service of the period, covering from 10 to 12 years after their coming into possession of the Pennsylvania.

Nearly all of the engines referred to, both on the Philadelphia & Columbia Railroad, and on the Allegheny Portage Railroad, had copper fireboxes and brass flues. Of the engines used on the Allegheny Portage Railroad, the Baldwin, Smith & Perkins, and the four built by R. Norris & Son, were coal burners.

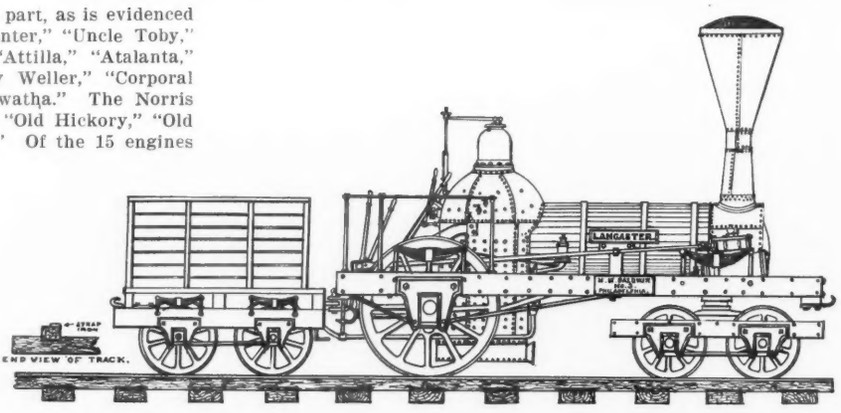
The nomenclature of the earlier engines was derived chiefly from towns, counties, streams, and an occasional man of note, but after the Brandt engines came it was evidently secured from a

wider field in which literature played no small part, as is evidenced by such names as "John Gilpin," "Tam O'Shanter," "Uncle Toby," "Bardolph," "Old Fogy," "Young America," "Attilla," "Atalanta," "Alaric," "My Son Samivel," "Yorick," "Tony Weller," "Corporal Trim," "Fingall's Baby," "Falstaff" and "Hiawatha." The Norris engines boasted of a "President," "Governor," "Old Hickory," "Old Dominion," "Hoosier State" and "Washington." Of the 15 engines on the Allegheny Portage Railroad nine were called for counties, towns, men and streams; two for heathen deities, and one for an Indian tribe.

At the date of their sale to the Pennsylvania that company had just begun the substitution of numbers for names, and all of the state engines had their names removed and were numbered consecutively with those already running. The state, as has already been mentioned, owned no cars except, perhaps, a few used in maintenance of way. Each shipper provided his own equipment in this line, or depended upon the opportunities afforded him through the cars of his more fortunate competitors. Some shippers owned but a single car. These small owners were principally dealers in produce, market gardening, etc. One such owner was an Irishman whose name I do not recall, but who was well known to the officials and employees for his frequent reference to his "big caahr," as he called it, and is reputed to have chased an engineman with a club because he suspected nim of having intentionally run his engine into the end of this famous "caahr!"

The success of these individual owners, especially of those owning cars in larger numbers, led to the formation of transportation companies, chief among which were two lines, well known in those days, the one that of Leech & Company, and the other the Wallower Line. Both owned large numbers of box and flat cars, some four-wheel, others eight wheel.

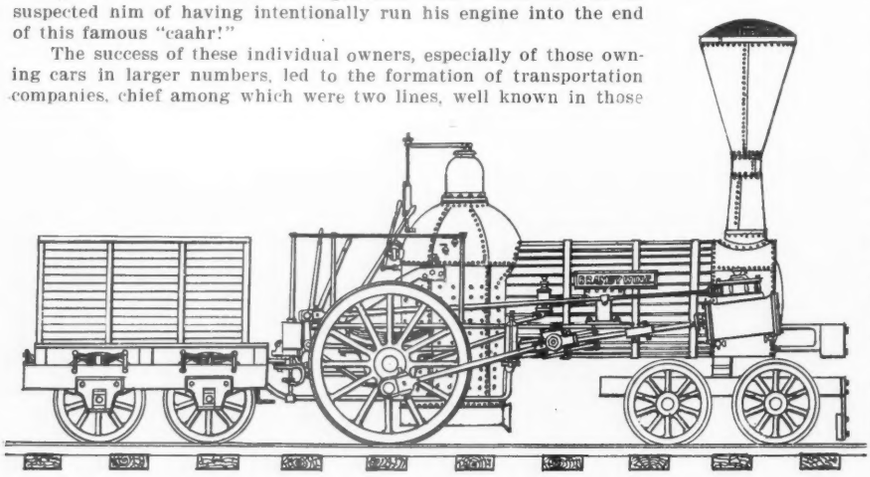
These two companies also owned boats on the canals which with the Allegheny Portage Railroad formed the connecting links between Columbia and Pittsburg, and although much freight was still carried in these cars and boats over the railroads and canals of the state after the Pennsylvania was opened to Pittsburg, the Leech and the Wallower cars were occasionally seen passing over the entire length of the Pennsylvania Railroad, when the stately Susquehanna, the Blue Juniata, or the foamy Conemaugh had burst their barriers and swept away portions of the canals.



The Lancaster (No. 3), Built by M. W. Baldwin in 1834 for Philadelphia & Columbia Railroad.

Weight on drivers, about 10,000 lbs. Total weight, about 15,000 lbs. Boiler, 35 in. inside. Horseshoe firebox, 30 in. long inside. Cylinders, 10x 16 in.

The box cars had the roofs extended at each end, forming a hood over the platforms as on passenger cars. Most of the brakes were operated by a lever at one side of the car. The passenger cars were furnished by those engaging in this branch of transportation, and the advertisement reproduced from a Columbia paper of 1850 is interesting in that connection.

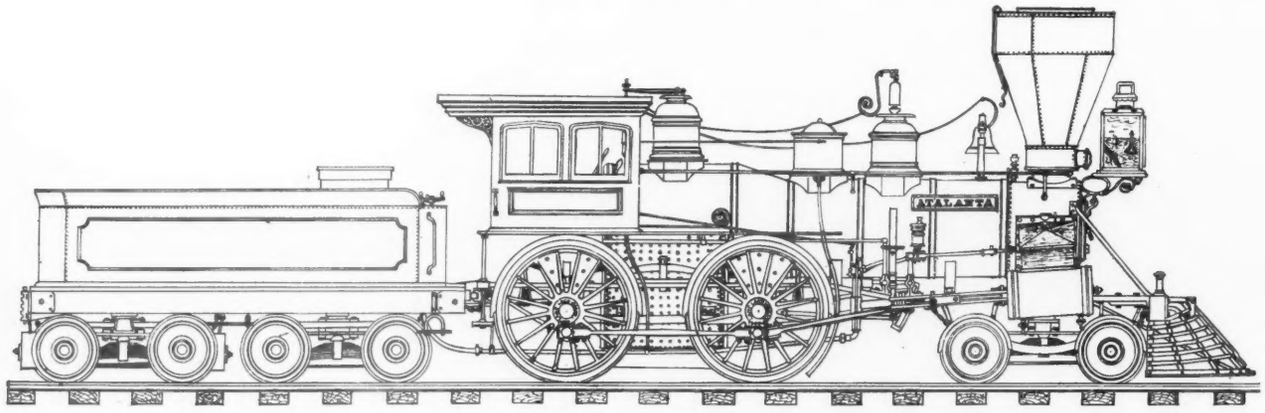


The Brandywine. Built by M. W. Baldwin in 1835.

Weight on drivers, 12,000 lbs. (approximately). Total weight, 20,000 lbs. Boiler, 35 in. diameter. Horseshoe firebox, 30 in. long inside. Cylinders, 10x18 in.

The names used in the foregoing description of the railroad equipment would have sounded strange to the railroad men of those days, as what we call a box car was known to them as a "house car," and a flat or gondola was simply a "truck." A freight train was called a "burden" train. Many other expressions were used at that time which would scarcely be understood in connection with railroad work to-day. The engine cab was the "house" at its first adoption, and "tolls" were used instead of freight rates. This word no doubt was handed down to the railroad from its predecessor, and erstwhile competitor, the turnpike, and as the first cars had but four wheels, and a certain toll per car was charged, for its passage over the lines, the word "wheel toll" added to the railroad vocabulary, and when eight-wheel cars were introduced they were always charged for at the rate of two cars.

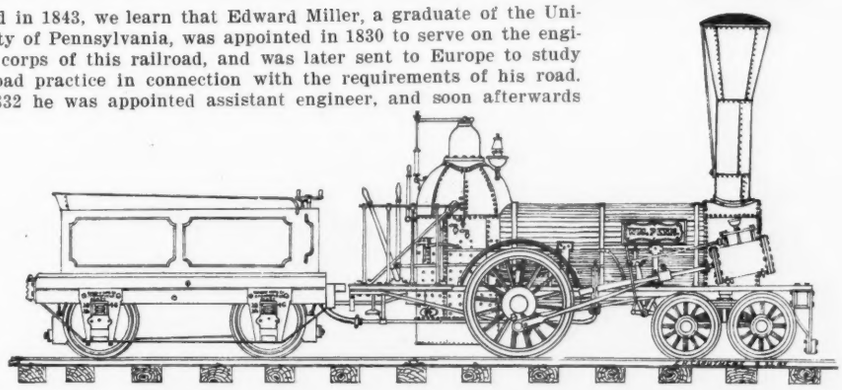
The other section of the state railroad was that extending from Hollidaysburg to Johnstown across the Allegheny mountains, and was known as the Allegheny Portage Railroad, already referred to in the description of equipment. The first section of the canal terminated at Hollidaysburg, and all freight and passengers were there transferred to the railroad or such other conveyances as might offer. From Sherman Day's "Historical Collections," pub-



The Atalanta, Built by Lancaster Locomotive Works in 1853 for Philadelphia & Columbia Railroad.

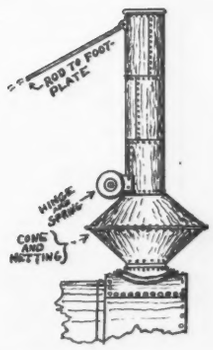
Sold, with all state railroad equipment, to the Pennsylvania Railroad in 1857. Worn out in 1883. Cylinders, 16x20 in. Drivers, 66 in. Weight, 55,200 lbs. Weight on drivers, 33,200 lbs. Inside journals and frames on tender trucks.

lished in 1843, we learn that Edward Miller, a graduate of the University of Pennsylvania, was appointed in 1830 to serve on the engineer corps of this railroad, and was later sent to Europe to study railroad practice in connection with the requirements of his road. In 1832 he was appointed assistant engineer, and soon afterwards



The William Penn (P. R. R. No. 1) in 1846.

Weight on drivers, 14,600 lbs. Total weight, 23,350 lbs. Cylinders, 10x20 in.

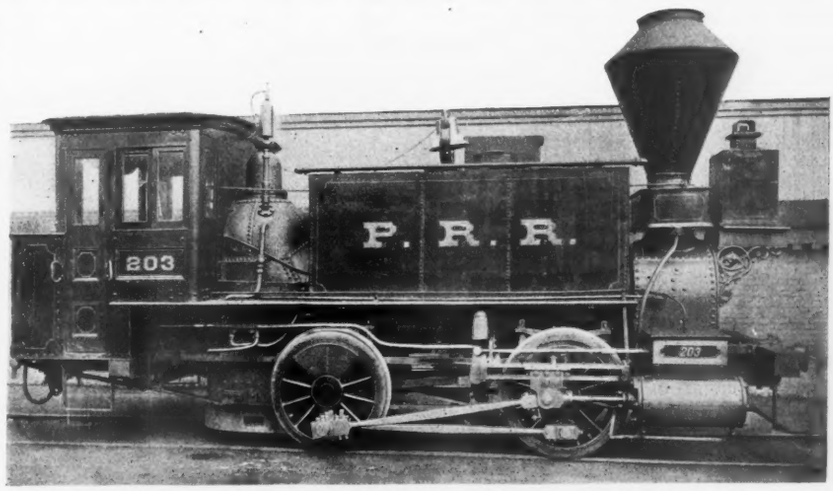


Inverted Diamond Stack, About 1849-1853.

was made superintendent of machinery. At the opening of the road on March 10, 1834, he had 10 stationary engines in operation at the planes, and 10 more building as reserves, and all were completed by the close of 1835, finishing what was then considered one of the greatest undertakings of the age.

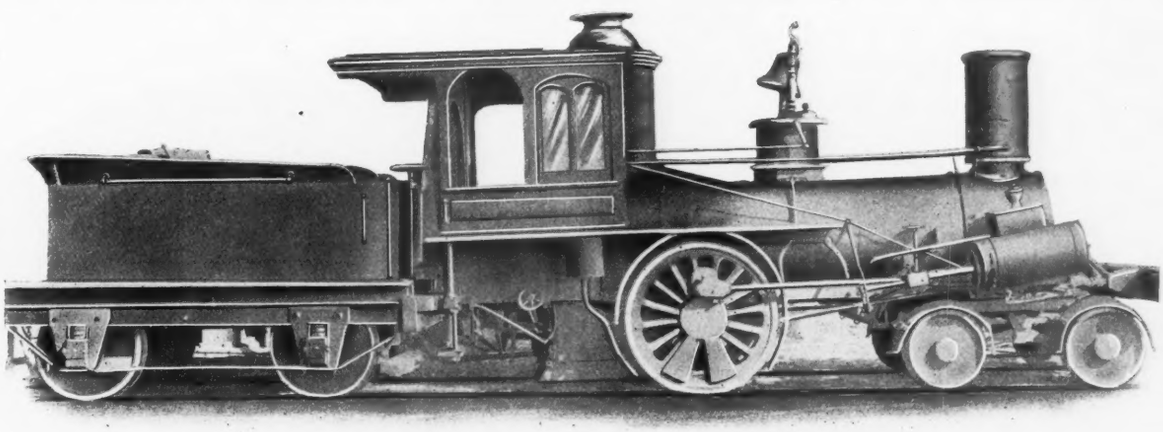
A wood cut in the work referred to conveys a fair idea of the conditions prevailing at Hollidaysburg at that time. Part of a passenger packet boat is seen lying at the wharf in the slip in the foreground, and on the railroad nearby are both freight and passenger cars, while a "Conestoga" wagon is seen just starting up the main street of the town. It is to be regretted that the artist did not portray these cars with the same accuracy that he has given to the boat. Some of the warehouses and a portion of the railroad shops appear in the foreground, and the background is devoted to the central part of the borough. A marine railroad upon which the "section boats" were run on or off the trucks used in carrying them across the mountains, and a "screw-dock," whatever that may have been, are not shown in the illustration, although both are stated to have been at Hollidaysburg. There were also 10 or 11 forwarding houses and immense warehouses and several hotels.

From Hollidaysburg west a portion of the road at least was laid on stone blocks instead of wooden ties, and within a very few years a number of these blocks still remained in place and were occasionally sketched by artists in their summer rambles through the picturesque scenery of the neighborhood. Like its later neighbor, the Pennsylvania, it also had a horse-shoe curve, and 10 inclined planes carried it over the steeper portions of its route. The remains of the embankment of one of these planes still exists at Lilly's station, on the western slope of the mountain, and is plainly visible from the trains of the Pennsylvania. These planes were afterward avoided by a new road built by the state at a cost of $2,000,000, which approached the Pennsylvania opposite the upper end of that company's famous horse-shoe bend at Kittanning Point, and continued westwardly along the opposite side of the glen until it reached the summit a short distance south of the Gallitzin tunnel. Here it passed through the mountain by a shorter tunnel of its own and then followed the line of the Pennsylvania closely as far as South Fork. All of these lines across the mountains were operated for a few months by the Pennsylvania after it purchased them, but their expenses, although much less than under the management of the commonwealth, were found to so largely exceed the income derived from them that it was deemed wise to abandon



State Locomotive Montgomery (Allegheny Portage Railroad), as Rebuilt by the Pennsylvania in 1866.

The original boiler, firebox, dome and smokestack remain. Also cylinders, but these have been set lower down than when first built. The "Montgomery" was built by Norris Brothers in 1850, with four drivers and a 4-wheel truck. Principal dimensions at that time: Cylinders, 12x24 in.; drivers, 54 in.; weight on drivers, 25,300 lbs.; total weight, 40,800 lbs. Engine was retired from service in 1873.



The William Penn as It Appeared in 1898.

them and remove the rolling stock and all other available material to the main line. It was also found here, as on the Philadelphia & Columbia Railroad, that the state had done no more repairing or made no purchases of new materials during the months in which negotiations for the transfer of the roads were pending than could not possibly be done without, and hence most of the locomotives required immediate and heavy repairs.

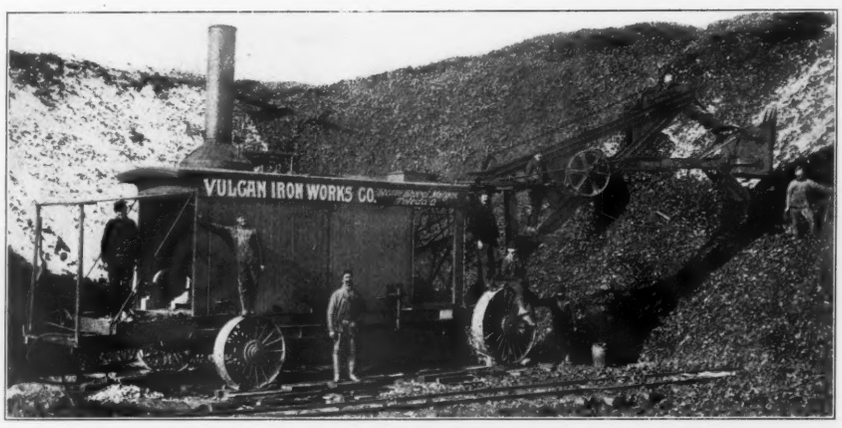
The Allegheny Portage Railroad was not a double-track road, but had several passing sidings; and the right to remain on the main line belonged in the earlier use of the road to the train which first arrived at certain posts placed near the siding. Hence great efforts were made by trains due to pass each other to be the first at these posts, and as a consequence collisions are said to have occurred frequently.

The "Historical Collection" referred to also states that a missionary of the Seamen's Friendly Society was stationed permanently at Hollidaysburg to look after the general welfare of the boatmen on the canal, and it is but reasonable to suppose that a portion of his efforts was also accorded the railroad employees.

It may be of interest to note in closing this article that the new freight route or "cut-off" of the Pennsylvania between Hollidaysburg and the point of its union with the main line below Gallitzin on the western slope of the mountain follows the roadbed of the Old Portage to its junction with the New Portage referred to already, and thence over the roadbed of the latter to the summit, and through the old tunnel to the main line.

Steam Shovels in Anthracite Coal Mining.

One of the interesting uses to which steam shovels recently have been put is the stripping of anthracite coal lands in Central and Eastern Pennsylvania. Some years ago a builder of this class of machinery went into this district for the purpose of designing some kind of machine for handling anthracite culm, which at that time was considered of very little value, other than for use as low grade fuel. The price of the culm at that time was therefore so low it could not be handled by hand profitably. The machine which he designed, although quite crude, was used for handling this culm and worked very successfully, but was confined to that particular use. One objectionable feature of the machine was the unhandiness in moving it from one pile of culm to another. Soon after the introduction of this first machine a new type was introduced, which was mounted on traction wheels, was self-propelling, and in many other ways was a great improvement. It was an adapted "Little Giant" steam shovel, built by the Vulcan Iron Works Co., Toledo, Ohio. The accompanying view shows one of these machines in this service. The type has been used for years by the large miners of anthracite coal, and is still in use. It has enabled these miners to turn to a profit what was previously a dead loss, this class of fuel being now exclusively used by numerous large industrial plants.



Vulcan Steam Shovel Handling Anthracite Culm.

While millions of tons of anthracite coal have been taken from this district, and no doubt millions of tons remain, the deep mining is growing less every year. When mine owners first became aware of this fact, they began to look about for some means for keeping up the supply of this class of coal. It was known at that time that there were thousands of acres of coal land still left, but the problem of mining it was so great there was little hope of its ever being produced at a profit. The reason for this was that many acres of this land had large veins of coal underlying the surface from 10 to 50 ft.—an insufficient depth to undermine safely. The increasing scarcity of timber, so much of which is needed in such shallow mines, made that method of mining impossible, and to strip it by hand was out of the question. Thus the matter stood until some three or four years ago, when a successful miner and producer of coal conceived the idea of using a steam shovel for stripping the material off of the underlying coal. It was at that time thought to be feasible to strip the coal where the depth of stripping was not over 10 to 15 ft. A steam shovel maker was called into consultation in the matter, and after careful consideration it was decided by the operator to try it. A steam shovel of suitable size and capacity was installed, with results far in advance of the expectations of any of the parties concerned. The problem of surface mining of anthracite was thus solved, and today steam shovels are considered an indispensable factor throughout the anthracite coal region of Pennsylvania.

The use of steam shovels in stripping coal lands is not confined to the anthracite regions, but is being adopted as well throughout the bituminous districts in Missouri, Kansas, Oklahoma and Indian Territory, with comparative success. A detailed account of the use of the steam shovel in connection with the mining of bituminous coal will be given in a future article.

We are indebted to the Vulcan Iron Works Co., Toledo, Ohio, for the foregoing.

A Railroad Journey in Honduras.

An 18-hour trip of 37 miles over the length of the Interoceanic Railway of Honduras from Puerto Cortez to San Pedro is thus described by a correspondent of the New Orleans *Times-Democrat*:

The leaving time was 6 o'clock, but we didn't pull out of Puerto Cortez until 10 in the morning. The train consisted of a wood burning engine, four flat cars and a passenger coach. Our crew was composed of an engineer, a half dozen firemen, one brakeman and the conductor. There was an extra man, but in the whole vocabulary of railroads I find no name for him. His position, however, was a commanding one, and, as subsequent events proved, a most important one. He perched himself on the front of the engine, above where the cowcatcher should be, and upon occasion industriously ladled sand from a box beside him to the rails in front. Our numerous firemen passed the wood from the cars to the engine, and at various points along the road turned into a bucket brigade and supplied water from nearby streams to the engine. The engineer was a Jamaican who invariably announced our approach to a village by putting the hard pedal on the whistle, at which the entire population turned out to greet us.

The engineer's musical efforts came near causing a catastrophe at one point where we encountered a very heavy grade. Just before we reached the top of the hill he thoughtlessly pulled the whistle cord, and in the screaming blast that followed, the steam gave out and the train began to slip back. Although the cars were without brakes of any kind, the company had prepared for such emergencies by providing a mahogany log on the rear platform to be dropped under the rear wheels. Unfortunately the rear brakeman was asleep on a flat car in front, and before he awakened the momentum of the train was so great as to render the remedy unavailing. We ran so fast and so far in the next fifteen minutes that it took us four hours to get back.

At Laguna, 10 miles out, there was a stop of forty minutes to replenish sand and water. Leaving Laguna, the train plunged into a tropical swamp and forest. The foliage was indescribably luxuriant and beautiful. Mile after mile we passed through archways of bending palms, gigantic in size, and through groves of corozo trees. To my mind the latter is the most perfect representation of the picturesque in tropical vegetation. Its trunk is clad in the richest attire of parasitic life; its wonderful feathery leaves, often 30 or 40 feet long, bend in elegant and graceful curves under the weight of their own luxuriance or the burden of the ornamental vines, while beneath all this mass of tropical richness may be seen clusters of delicious cahorn nuts hanging like immense cornucopias containing two or more bushels. For a distance we passed a deep, swift stream, which flows for miles through a wild jungle, in the eternal shadow of the gigantic celba, cedar and rubber trees, between whose moss and vineclad trunks grow palm trees of every description. Precious woods are here so common that rosewood is often used for telegraph poles, and the ties are of mahogany.

Emerging from the jungle, we came to the banana plantations, and here I learned that this remarkable railroad transports to the steamers 60 per cent. of the bananas received at the port of New Orleans.

GENERAL NEWS SECTION

NOTES.

The Pacific Mail steamship "Manchuria," early this week, went aground on a reef near Honolulu.

The conductors on the Seaboard Air Line are likely to ask an increase of wages from the management.

The Big Four, it is reported, will soon operate a fruit and vegetable farm to supply its dining car service.

The commercial travelers of Missouri and of Arkansas are planning a campaign for a 2-cent a mile passenger rate.

The Union Pacific has issued an estimate of the corn crop of the state of Nebraska as probably 250,000,000 bushels.

The Houston & Texas Central carried over 3,000 people in excursions into Houston and Galveston on a recent week end.

It is reported that fast freight service will be begun over the St. Louis & San Francisco and the Louisiana & Arkansas.

The assessment of the Seaboard Air Line in Georgia has been raised over $440,000 at the instance of the Controller General.

The Southern Pacific has raised the carload demurrage charge on hay and lumber at San Francisco and Oakland from $1 to $5 a day.

Wages of trainmen on railroads entering Pittsburg have been raised in order to overcome the scarcity of that class of labor at that point.

The city of Chicago is seeking to have all the cars owned by the Pullman Company included in the company's assessment in Cook County.

Another meeting, this time of freight and passenger traffic officials, in connection with the new railroad rate law, began in New York on August 22nd.

The Santa Fe plans to divide its betterment and construction work into three zones, with headquarters respectively at Topeka, Albuquerque and San Bernardino.

The Illinois Central announces that it is planning to put into effect a system of distribution of coal cars which will be entirely equitable to all operators on its lines.

It is reported from Chicago that western roads will abolish preferential rates on coal to each other, making charges to another railroad the same as to the general public.

The elevator capacity of Kansas City is reported to be over 10,100,000 bushels, against 6,670,000 in 1903. The total yearly receipts of grain are now over 72,000,000 bushels.

The meeting of the railroad lawyers and traffic men at Atlantic City, which lasted for a week, adjourned without clearing up several disputed points in regard to the rate law.

The Minnesota Railroad Commission has sent notices to the railroads of the state requesting them to show cause why rates on coal and on farm products should not be reduced.

The Consolidated Railway, the New Haven's subsidiary company controlling electric lines, has made a general increase in wages, the rate of increase being governed by length of service.

The Union Railroad at Pittsburg, and the other railroads of the United States Steel Corporation which have hitherto kept outside, will enter the per diem agreement on September 1st.

County conventions in Nebraska, both democratic and republican, are instructing delegates to vote for a plank in the state political platform calling for a 2-cent a mile passenger fare.

A Virginia judge has decided that the Norfolk & Western no longer possesses the right of condemnation, owing to the repeal of state laws under which the company formerly exercised the power.

The Southern Indiana, the principal Walsh road, has complained to the Indiana Railroad Commission that the Big Four refuses to receive at Terre Haute coal originating on the Southern Indiana.

A Santa Fe train which had been detoured at Fort Worth, Tex., on account of floods, accidentally took the Missouri, Kansas & Texas track out of Fort Worth and ran several miles before the mistake was discovered.

The Great Northern, Northern Pacific and Minneapolis, St. Paul & Sault Ste. Marie have made a 10 per cent. reduction in grain rates in Minnesota, to apply in all territory more than 50 miles distant from terminals.

Employees of the Columbus, Ohio, shops of the Pittsburg, Cincinnati, Chicago & St. Louis to the number of 45 carloads went on a picnic recently to Sandusky, the transportation being furnished by the railroad company.

The Adams Express Company has asked the Interstate Commerce Commission to extend the time for filing its schedules from August 28, when the new rate law goes into effect, to January 1st, as it will not be able to file its schedules earlier.

Pending the decision of certain points at present the subject of negotiation between the Bureau of Animal Industry and the railroads, the bureau is holding back the publication of regulations between meat packers and common carriers.

The Pennsylvania is reported to have given a contract for lighting its future New York terminal station to the Nernst Lamp Company, of Pittsburg. This involves about 1,000,000 candle power and the cost to the road is reported to be $250,000.

The Attorney General of Vermont has brought suit against the Central Vermont Railroad alleging that the state has been compelled to pay higher rates for coal used in one of the state institutions than the rate charged to private concerns.

Owing to the carelessness of a Mexican laborer who was transferring dynamite from a Mexican Central car to a narrow gage car on a mining road in the state of Chihuahua, between 30 and 40 men were killed by an explosion of a carload of dynamite.

Three despatchers on the Louisville & Nashville have been arrested and brought before the United States Court on the charge of discriminating against members of the Telegraphers' union. The warrants were issued in order to bring a test case.

On Monday, August 20, the ninety-ninth anniversary of the first trip of Robert Fulton's steamer "Clermont," the new Hudson River Day Line steamer "Hendrick Hudson" made her maiden trip up the river from New York to Albany. About 3,000 persons were aboard.

According to the secretary of the state board of trade of Pennsylvania, which is leading the campaign for a 2-cent passenger fare, all but three of the nominees of all parties for the legislature in Pennsylvania have already signed pledges to vote for a 2-cent fare.

One of the first complaints which will be filed with the Interstate Commerce Commission under the new rate law is one from the National Petroleum Association, made up of independent oil refiners, on rates on oil in the Chicago, Omaha and St. Paul territory.

The Wisconsin Railroad Commission, which last week ordered a considerable reduction in grain rates has ruled that the existing rates on cheese from concentration points to Milwaukee are excessive and should be reduced in accordance with a tariff which is prescribed.

The railroads comprised in the Trunk Line and Central Traffic Associations will sell special round trip tickets at the rate of one first-class fare plus $2 from all points on their lines to New York City at the time of the return to this country of the Hon. William Jennings Bryan.

The Interstate Commerce Commission has been in session at Toledo in order to consider the question, turned over to it by the state authorities, whether the railroads running through Ohio have a right to charge 3 cents a mile on interstate business in face of the Ohio 2-cent a mile law.

The Imperial Grain Commission which was appointed to investigate the growth, grading, transportation and marketing of wheat throughout Canada, plans to visit New York, Chicago and the grain markets of Europe in the course of its inquiry. Its object is to curb speculation in grain.

The damage done to the Southern Pacific near Langtry, Tex., by the recent floods, is greater than originally reported. At least one man was killed and 15 bridges and culverts were carried away. A second flood occurred on August 13th, adding to the losses caused by the one of two days before.

The Northern Pacific has made the low rate of $25 from Duluth, St. Paul, Minneapolis and Missouri river points to all points in Oregon and Washington in order to attract laborers to those states. The rate applies only to parties of 20 or more traveling on one ticket and gives no privileges in sleeping or dining cars.

A republican candidate for the Pennsylvania legislature at York, Pa., has pledged himself, if elected, to introduce a bill requiring all street railway corporations to sell to working men and women 50 tickets for single trips between 6 and 7 a. m., 12 and 1 p. m., and 5 and 7 p. m., for $1, or at the rate of 2 cents a trip.

The superintendent of the company which is building the extension to Birmingham of the Atlanta, Birmingham & Atlantic has been arraigned before the United States Commissioner at Columbus, Ga., on the charge of peonage, the charge growing out of a complaint made by foreign laborers brought to Georgia by the construction company.

The Indiana Railroad Commission, in behalf of the state, has filed suits to oust the Adams, American and United States express companies from Indiana and to forfeit their charters on the ground that the companies habitually violate the law which requires them to deliver express within the corporate limits of all cities with a population of over 2,500.

The Acting Attorney General of the United States has sent an opinion to the Department of Commerce and Labor holding that ordinary hands commonly employed in construction and maintenance of railroad tracks are not skilled labor within the meaning of the Contract Labor law and consequently cannot be imported from Mexico under contract.

At the Columbia, S. C., shops of the Southern Railway about 100 car repairers and car inspectors, members of the Brotherhood of Railroad Carpenters, struck as a result of the introduction of piece slips on which was recorded the length of time a man was engaged on a particular job. The men object to the piecework system, and apparently feared that this was the first step in its introduction.

Complaint has been made to the Indiana Railroad Commission that it is impossible for many shippers to obtain cars without paying conductors or brakeman $1 or $2 each for them. An elevator company on the Lake Erie & Western testified that it was told by members of a train crew that cars consigned to it had been sold to another firm at $2 each but that it could have cars at the same rate.

The Chicago Board of Trade has written to lines east of Chicago inquiring whether they expect to take any action to meet the present rate of 5 cents from St. Louis to Toledo and Detroit made recently by the Toledo, St. Louis & Western, which compares with a rate of 6 cents from Chicago. It is from 230 to 245 miles from Chicago to Toledo and Detroit, as against 450 to 490 from St. Louis.

The Toledo Car Service Association has adopted new rules to go into effect September 1, under which coal dealers are allowed only 24 hours after notice of the arrival of a car to order its switching and only 48 hours after that in which to unload it. After these periods $1 a day is to be the demurrage charge. Until recently 7 days were allowed in which to serve the switching order and 4 days to unload.

Seven were killed and three fatally injured in a wreck on the Pennsylvania, near Johnstown, Pa., on August 19, when a fast freight which had received a caution card warning it of a wrecking train in the block ahead, ran into the wrecking train, which had stopped at a water plug just beyond track tanks. The engineer of the fast freight had increased his speed in order to take water at the tanks.

The Santa Fe in September will open a school for instruction in telegraphy and station agents' duties at the Topeka Business College. The main telegraph line of the road will be connected with the school so that students will have opportunity to hear actual railroad messages. The school will replace the present system of apprenticeship in which an apprentice worked for three years under an agent or operator.

An agreement has been drawn up, to go into effect September 1 and expiring April 1 of next year, by which on all export grain gulf lines will receive a differential of 5 cents from Kansas City and 4 cents from Omaha, exclusive of "fobing" charges. Under the new tariff the rate on corn will be 21¼ cents and on wheat 22¼ cents from Kansas City to Baltimore, against 16¼ and 17¼ cents respectively on the same grains to gulf ports.

Firemen on the Pennsylvania's new low grade freight line near Harrisburg, Pa., have refused to run the freight engines without helpers, claiming that a 15-mile grade on one section of the line necessitates too hard work for one fireman. It is said that a round trip means shoveling at least 65,000 lbs. of coal. The company has offered brakemen an extra 4 cents an hour if they will help the firemen but they have refused.

Arrangements for switching cars of bulk freight from one road to another at New Orleans, either to or from industries not situated on the lines over which they wish to ship, instead of the drayage system now in force, which has been the cause of considerable friction, have now been brought under an agreement, assented to by seven railroads, under which free and satisfactory movement is expected. Each of the roads agrees to switch for any one of the others, beginning August 27.

Some 200 excursionists from Easton, Pa., on the Lehigh Valley, having, on account of a misunderstanding as to the leaving time from the New York side of the river, missed the last train on which their return tickets were good, spent the night recently in the Pennsylvania station in Jersey City. Word was finally received from the Lehigh Valley management that their tickets would be accepted on the train leaving Jersey City at 6:40 a. m. The excursion rate was $1.

The Brooklyn Rapid Transit controversy in regard to the rate of fare to Coney Island, following Judge Gaynor's obiter opinion on the subject, has been settled for the time being by the company's issuing rebate tickets which will be worth 5 cents each in case the Court of Appeals of the state of New York decides that a 10 cent fare to Coney Island is illegal. In order to make a test case the Attorney General of the state will apply for a permanent injunction to restrain the company from charging more than 5 cents.

The strike in the Aguascalientes shops of the Mexican Central has come to an end through the advice of President Diaz of Mexico. According to a despatch signed by the President of the railroad, President Diaz indicated to the strikers' committee which had appealed to him for support, that foreign capital would be protected to the fullest extent and that the interests of any particular class would not be allowed by combination to interfere with the duty which such enterprises as railroads owe to the government and the general public.

President Stickney, of the Chicago Great Western, has sent a letter to the directors of the Minnesota Transfer Company warning them that in offering to give Armour car lines free switching to and from the Armour stock yards as an inducement to Armour to build a new packing plant at St. Paul they violate the new Interstate Commerce law and make themselves and Armour & Company liable to fines of from $1,000 to $20,000. This is on the ground that such action would be a discrimination against the Union Stock Yards at South St. Paul.

President Tuttle on the New Hampshire Campaign.

President Tuttle is quoted as follows in regard to the charges made against the Boston & Maine of political domination in New Hampshire:

"The campaign fulminations against this railroad are too extravagant to require any answer in detail. The utterances for the most part carry with them their own refutation. The most active disseminator of these criticisms is Winston Churchill. Mr. Churchill, as a novelist, is capital, but as a novelist he has evidently become accustomed to disregarding facts or twisting them to serve his purpose. In this campaign, true to his literary instincts, he has shown himself a master of fiction."

Portable Creosoting Plant for the Southern Pacific.

The Southern Pacific has given a contract to the Erie Heating Company, of Chicago, San Francisco and Portland, Ore., for a portable wood preserving, creosoting and Burnettizing plant to be used for treating ties, piles and bridge timbers, with a yearly capacity of about 1,250,000 ties. The plant will be erected at Los Angeles at once and then sent to Guaymas, Mex., to be used for ties on the new Harriman extensions in Mexico. In transit it will occupy six cars. This is the fourth portable creosoting plant on the Harriman lines, besides two stationary plants also in use.

Twentieth Century Limited Derailed.

The eastbound Twentieth Century Limited was wrecked on August 18 on the Lake Shore & Michigan Southern near Elyria, Ohio. The train ran off a derail at a crossing of the Baltimore & Ohio, and it was reported that the derail was open because a B. & O. freight train was blocking the crossing. The engine, combination car, baggage car, buffet car and one dining car left the track. The engineer and fireman jumped and there were no serious injuries.

Two Cents a Mile on the N. Y., N. H. & H.

The following announcement has been issued by the New York, New Haven & Hartford in regard to the reduction in passenger fares on the Shore Line:

"The through Boston and New York rate will not be changed until November 1, when our last tariff on the two-cent-a-mile basis (i. e., betwen New Haven and New London) will be put into effect. The new rates to New York from Boston and Providence will be $4.65 and $3.75 respectively, made on the combination of locals as follows: Boston and Providence, 90 cents; Providence and New London, $1.25; New London and New Haven, $1; New Haven and New York, $1.50."

Manufacturing and Business.

The Quincy, Manchester, Sargent Company, Chicago, has opened a Priest snow flanger department. Orders already booked for the season's delivery include 22 flangers for Canada, and others for Japan, Alaska and Europe.

Mrs. Frances A. W. McIntosh, formerly Advertising Manager of the Standard Tool Co., Cleveland, Ohio, and more recently in the advertising department of *Power*, New York, now has charge of the publicity department of the Norton Company, Worcester, Mass.

The Strauss Bascule and Concrete Bridge Company and the Wallace-Coates Engineering Company, both of Chicago, announce that they have entered into an agreement whereby the latter will act as general sales agents and constructors for Strauss bascule and concrete bridges. Under the new arrangement the Strauss Company will confine itself exclusively to the engineering work in connection with its special designs, and also will give its attention to general engineering. The Strauss Company has its bascule bridges under construction at Rahway, N. J., for the New Jersey Short Line R. R.; at Camden, N. J., for the County of Camden; at Staten Island, N. Y., for the Staten Island Rapid Transit Co.; at Lockland, Ohio, for the County of Hamilton; over the Black river for the Missouri Pacific R. R.; and at Copenhagen, Denmark, for the City of Copenhagen. The second largest single-leaf bascule bridge in the world is the Strauss bridge for the Wheeling & Lake Erie R. R. at Cleveland, O., completed in October, 1905. The same company has also just completed one of its ribbed concrete steel bridges (a four span, single-track structure) at Belvidere, Ill., for the Elgin & Belvidere R. R. The Wallace-Coates Engineering Company was organized a short time ago and incorporated in Maine with a capital of $500,000. It was organized by H. U. Wallace, who was formerly Chief Engineer of the Illinois Central, and who during the past year has been Third Vice-President of the J. G. White Company, New York, and by F. R. Coates, formerly Chief Engineer of the Chicago Great Western, and for the past two years Vice-President of the Thos. Phee Company, Chicago. The company was organized to do a general engineering, reporting, and construction business, and under the arrangement with the Strauss Bascule Bridge Company, will give particular attention to the sale and construction of the Strauss bascule bridge and reinforced concrete arch, also to reinforced concrete building construction. This company has opened an office in Portland, Ore., in charge of O. O. Alexander, General Western Agent.

Iron and Steel.

According to a Consular report, the Japanese government's steel foundry at Wakamatseu is to be again enlarged, for which $1,250,000 has been appropriated. An additional sum of $5,000,000 will be applied for during the next session of the Diet, and it is expected that the output of iron will be increased from 90,000 to 180,000 tons per year.

The Northern Indiana has ordered 2,100 tons of rails for 1907 delivery from the United States Steel Corporation. Orders aggregating 8,000 tons for small steam roads and electric lines have also been let for 1907 delivery, and about 5,000 tons for small companies have been given for delivery this year. The Missouri, Kansas & Texas is negotiating for 5,000 tons, and has given orders for about 14,000 tons of spikes and bolts. The Western Pacific has ordered 15 steel bridges from the American Bridge Co.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

Traveling Engineers' Association.

The Traveling Engineers' Association will meet at the Auditorium Hotel, Chicago, August 28 to 31, inclusive.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Astoria & Columbia River.—G. W. Talbot, General Manager, has been elected also Vice-President and Treasurer.

Erie.—H. W. Andrus, Assistant Claim Agent at Cleveland, Ohio, has been appointed General Claim Agent, with office at New York, succeeding W. C. Cannon resigned, to go into other business.

Parral & Durango.—A. G. Field, Acting Auditor, has been appointed Auditor, with office at Parral, Mexico.

Operating Officers.

Boston & Maine.—D. W. Sanborn, General Superintendent, is to retire on September 1st. C. E. Lee, Assistant General Manager, will succeed Mr. Sanborn, and the office of Assistant General Manager will be abolished.

Cincinnati, Hamilton & Dayton.—G. A. Waldo, formerly Superintendent of Car Service, has been reappointed to that position, succeeding W. C. Andrews, resigned.

St. Louis & San Francisco.—E. D. Levey has been appointed to the new office of Assistant Superintendent of Car Service at Springfield, Mo.

St. Louis, Iron Mountain & Southern.—H. L. Hungerford, who was recently appointed Superintendent at Wynne, Ark., was born in Michigan in 1867, and began railroad work in 1883 as an operator on the Michigan Central. In 1890 he went to the Richmond & Danville as train despatcher, and two years later was appointed chief despatcher of the Mobile & Birmingham. He was later appointed Trainmaster and Car Accountant and then General Superintendent of that road. When the Mobile & Birmingham was absorbed by the Southern in 1899, Mr. Hungerford went to the Mobile & Ohio as chief clerk to the Superintendent. The next year he was made Trainmaster and in 1905 Superintendent of Terminals. In February, 1906, he was appointed Superintendent of Terminals, at Little Rock, of the St. Louis, Iron Mountain & Southern, where he remained until transferred to his present position.

Parral & Durango.—R. J. Long, General Freight and Passenger Agent, has been appointed Assistant Manager, with office at Parral, Mexico.

Wrightsville & Tennille.—D. R. Thomas, who was recently appointed Secretary and Superintendent, was born in North Carolina in 1866. He began railroad work in 1884 as a clerk on the Richmond & Danville. After becoming operator on that road, he went to the Norfolk & Western, where he served as operator and agent at various points. In 1889 he went to the Wrightsville & Tennille, where he was train despatcher and later Car Accountant, being appointed in 1894 Secretary, Treasurer and Trainmaster. In 1901 he was made Auditor and Secretary, holding this position until appointed to his present office.

Traffic Officers.

Chicago & Eastern Illinois.—F. C. Reilly, who was recently appointed General Freight Agent, was born in Missouri in 1870, and was educated at Washington University, St. Louis. He entered railroad service in 1887 as a clerk in the general freight office of the St. Louis & San Francisco. He remained with this company as traveling freight agent and later general agent until 1904, when he was appointed Assistant General Freight Agent of the Chicago & Eastern Illinois. From this position he was promoted to General Freight Agent on Aug. 1, 1906.

Dominion Atlantic.—F. H. Armstrong, General Passenger Agent, has resigned. R. U. Parker has been appointed Acting General Passenger Agent, with office at Kentville, Nova Scotia.

Mexican Central.—J. C. McDonald, who was recently appointed General Passenger Agent, began railroad work in 1895, when he was 17 years old, as agent and operator on the Southern Pacific. In 1897 he was made traveling freight and passenger agent of this company at Los Angeles, Cal. The next year he was appointed agent at Pasadena, Cal., and in 1901 went to the National of Mexico as chief clerk in the traffic department. Four years later he was appointed general agent at San Francisco for the Mexican Central, and in February, 1906, was made Assistant General Passenger Agent, which position he held until his recent promotion.

New York Central & Hudson River.—The duties of Industrial Agent will hereafter be performed by F. L. Pomeroy, Freight Traffic Manager, the office of Industrial Agent having been made vacant by the death of Samuel Goodman.

Engineering and Rolling Stock Officers.

Atchison, Topeka & Santa Fe (Coast Lines).—H. C. Phillips, heretofore Chief Engineer of the San Francisco & Northwestern, which is controlled by the Santa Fe, has been appointed Chief Engineer of the A., T. & S. F. Coast Lines, with office at Los Angeles, Cal., succeeding R. B. Burns, deceased.

International & Great Northern.—A. L. Bowers, Superintendent in charge of Buildings, Bridges and Water Service, has resigned, and the authority of O. H. Crittenden, Resident Engineer at Palestine, Texas, has been extended over the Bridges, Buildings and Water Service departments.

Lake Shore & Michigan Southern.—O. M. Foster, general road foreman of engines, has been appointed Assistant Master Mechanic at Elkhart, Ind., succeeding Joseph Chidley, promoted.

Pennsylvania Lines West.—F. S. Irvine has been appointed to the new office of Right of Way Engineer in the real estate department.

San Francisco & Northwestern.—See Atchison, Topeka & Santa Fe Coast Lines.

LOCOMOTIVE BUILDING.

The Morelia & Tacambaro has ordered three locomotives from the Baldwin Works.

The Duluth, Missabe & Northern is reported as in the market for 12 to 14 locomotives.

The Western Pacific, it is reported, has ordered 20 locomotives from the Baldwin Works.

The Kansai Railroad of Japan is having three locomotives built by the American Locomotive Co. at its Pittsburg works.

The Mexican Central has ordered 32 oil burning consolidation locomotives from the American Locomotive Co. for November, December and January delivery. These engines will each weigh 198,700 lbs., with 179,000 lbs. on drivers.

CAR BUILDING.

The Pere Marquette is in the market for 500 gondola cars.

The Erie has just completed a new hospital car at its Buffalo shops.

The Colorado & Southern is asking prices on several hundred dump cars.

The Detroit, Toledo & Ironton is again reported in the market for new equipment.

The Mexican Southern has ordered two baggage cars from the Mexican Car & Foundry Co.

The Union Refrigerator Transit Co., Milwaukee, Wis., may build a few cars at its own shops to replace destroyed numbers.

The Illinois Traction System has ordered from the St. Louis and the American Car companies 27 cars, which are to be duplicates of those now in operation.

The Pennsylvania, it is reported, has notified the Postoffice Department that it will substitute steel mail cars for the wooden ones now in use. Seventy-five of these cars will be provided for immediate use.

The Missouri, Kansas & Texas has ordered one private car from the American Car & Foundry Co., and has under consideration the building of one additional motor car, but nothing definite has so far been decided upon.

The Spokane International has ordered six passenger coaches and three baggage and express cars from the Wason Manufacturing Co., for September delivery. These cars are first class in all particulars, and the style of cars about the same as are used on the New York, New Haven & Hartford road.

The Illinois Central, as reported in our issue of August 10, has ordered 20 coaches, five chair, two mail, 10 baggage and eight combination mail and baggage cars from the Pullman Co., all for January and February, 1907, delivery. The coaches and chair cars will be 67 ft. 11 in. long, 10 ft. 5 in. wide, and 14 ft. $5^{11}/_{16}$ in. high, over all. The mail cars will be 63 ft. 9½ in. long, 10 ft. ¼ in. wide, and 14 ft. 3 in. high, over all. The baggage cars will be 64 ft. 2 in. long, 10 ft. 4¼ in. wide and 14 ft. 2¾ in. high, over all. The combination cars will be 68 ft. 10 in. long, 10 ft. 4¼ in. wide and 14 ft. 2¾ in. high, over all.

The Canadian Pacific, as reported in our issue of August 3, has placed orders for 15 first class cars with smoking room, five first class cars without smoking room, five first class suburban cars and 10 baggage and express cars at its Angus shops. The first class and suburban cars will be 65 ft. long, over frame; the baggage and express cars will be 60 ft. long, over frame, and all cars will be 9 ft. 10½ in. wide, over frame. The special equipment for all includes:

Brake-beams	Simplex
Brakes	Westinghouse
Couplers	Tower
Curtain fixtures	Forsyth
Curtain material	Pantasote
Draft rigging	Miner Tandem
Heating system	Gold
Vestibules	Pullman

The El Paso & Southwestern has ordered two chair, one combination dining and passenger, one combination smoking and observation, one dining, one postal and two 66-ft. baggage cars from the Pullman Co., all for August, October and December delivery. The chair cars will be 78 ft. long, 10 ft. 4¼ in. wide and 14 ft. 2 in. high, over all. The combination dining and passenger car will be 80 ft. 6 in. long, 10 ft. 4¼ in. wide and 14 ft. 3 in. high, over all. The combination smoking and observation car will be 72 ft. 6 in. high and 10 ft. 4¼ in. wide, over all. The dining car will be 78 ft. long, 10 ft. 4¼ in. wide and 14 ft. 2⅜ in. high, over all. The postal car will be 63 ft. 11 in. long, 10 ft. 4¼ in. wide and 14 ft. 3¼ in. high, over all. The special equipment for all includes:

Axles	Pullman
Brake-beams	National Hollow
Brake-shoe	Streeter & Christie
Brakes	Westinghouse
Couplers	Janney
Curtain fixtures	Forsyth
Curtain material	Pantasote
Draft rigging	Waugh
Dust guards	Symington
Heating system	Safety Car Heating & Lighting Co.
Light	Pintsch
Roofs	Pullman
Springs	Railway Steel Spring Co.
Trucks	Pullman
Vestibules	Pullman

RAILROAD STRUCTURES.

Atlanta, Ga.—The Gate City Terminal Co., which has charge of the terminal facilities in Atlanta for the Atlanta, Birmingham & Atlantic and the Seaboard Air Line, has let a contract for grading and excavating for a new freight house to Lane Brothers & Co., of Lynchburg, Va. The cost of the work will be about $500,000.

Cumberland, Md.—Local reports state that the Western Maryland is securing a large tract of land in Mineral County, W. Va., opposite this city, as a site for large shops.

Harahan, La.—A fire recently destroyed the Illinois Central machine shops and boiler room at a loss of nearly $50,000.

Los Angeles, Cal.—Local reports state that the Atchison, Topeka & Santa Fe has approved designs and let contracts for reinforced concrete roundhouse buildings aggregating in cost $250,000. The plans include a large roundhouse at Bakersfield, to cost $150,000; buildings at San Bernardino, to cost $45,000, Point Richmond $42,000 and a roundhouse at Williams $22,000.

Montgomery, Ala.—The Louisville & Nashville is reported planning to enlarge and rebuild its shops at a cost of $50,000.

Mt. Vernon, Ill.—The Chicago & Eastern Illinois is reported to be planning to build a reservoir to have a capacity of 20,000,000 gallons two miles east of this place.

North Towanda, Pa.—Bids are shortly to be asked for putting up a brick passenger station 36 ft. x 104 ft. for the Lehigh Valley, also for train sheds, to be 475 ft. long.

Omaha, Neb.—Bids were recently asked by the Chicago & North-Western for putting up a large office building 50 ft. x 80 ft., to cost about $100,000.

Pittsburg, Pa.—The Pennsylvania, according to local reports, has bought ground and will spend $10,000,000 for a new union passenger station at this place.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

Atlanta, Birmingham & Atlantic.—An officer writes that the contract recently let to C. D. Smith & Co. is for work on its line from Talladega, Ala., through Renfrew Gap, crossing the Coosa river near Grovers Ferry and the Central of Georgia track about one mile south of Vincent, thence via a point just north of Harpersville, Shelby County, Alabama, through Big Narrows, in the same county, down Peavine creek to Pelham. The company is building several hundred miles of road and has let contracts for the line between Brunswick, Ga., and Birmingham, Ala., with the exception of about 20 miles from Pelham into Birmingham. Track has been laid to a point near Warm Springs, Ga., which is 264 miles from Brunswick. The line is being built on a 6 deg. maximum curve, with 1 per cent. maximum grades compensated for curvature. The work includes a large number of steel bridges and one tunnel. The company also has under contract 75 miles of line from Atlanta south through Fairburn, Senoia and Woodbury, to Chalybeate, where connection is to be made with the Brunswick-Birmingham line. The Callahan Construction Co. has this contract. There is also a plan for a line from Atlanta west about 100 miles, connecting with the Brunswick-Birmingham line and forming an air line from Atlanta to Birmingham.

Canadian Northern.—A. B. McRae, Fort Rouge, Man., has the contract for building 30 miles of road from Oak Point.

Canadian Pacific.—Sir Thomas G. Shaughnessy, President of this road, is quoted as saying that the company is to build a line through the mineral district on the Quebec side of Lake Temiskaming, and, probably, a spur to Cobalt, Ont.

Carolina Mineral.—Incorporated in North Carolina with $200,000 capital to build a line 40 miles long from Charlotte, N. C., on the Seaboard Air Line and the Southern Railway south through Mecklenburg and Union counties, North Carolina, to Lancaster, Lancaster County, S. C., on the Lancaster & Chester and the Southern. All but five miles of the road will be in North Carolina. J. Moore, of Waxhaw, N. C., and J. F. Keller, D. H. Kulp, S. N. Root and N. Musser are interested.

Chicago & North-Western.—The Wolf River Railway Company, recently incorporated in Wisconsin by officers of the C. & N.-W., has begun work on its proposed line from Bowler to Crandon.

Chicago, Joliet & Kansas City.—A meeting of the shareholders of this company has been called for October 15 to vote on a proposition to increase the capital stock from $1,000,000 to $12,000,000, of which amount $2,000,000 is to be preferred stock. The meeting is also to authorize an issue of $10,000,000. The company was incor-

porated in Illinois in March, 1905, to build a road from Chicago to Joliet, with branches in Mercer, Bureau, Rock Island, Kendall, Grundy and DeKalb Counties. E. F. Hoagland is Secretary.

CHICAGO, MILWAUKEE & ST. PAUL OF SOUTH DAKOTA.—This company has been incorporated with $4,000,000 capital to build from the Missouri river through South Dakota to the Montana state line.

CHICAGO, ROCK ISLAND & PACIFIC.—Adams & Peters, it is said, have begun work on a line 27 miles long for this company near Alexandria, La.

COLVILLE & COLUMBIA RIVER.—Under this name a company has been incorporated in Washington with $250,000 capital to build a 19-mile road between Colville and Myers Falls, Wash., with steamship connections on the Columbia river. The incorporators are: A. Wilkes, W. B. Aris, Ellen C. Gilluly, G. K. Gilluly and H. C. Rice, all of Spokane.

ELECTRIC TERMINAL OF KANSAS CITY.—Incorporation has been granted this company in Missouri, with $300,000 capital, to build a line five miles long wholly within the limits of Kansas City. The incorporators are: John Mayer, Parsons, Kan.; G. H. Kahmann, B. Steele, W. E. Winner and H. G. Pert, all of Kansas City. This is a revival of the Brush Creek project promoted by Willard E. Winner, who had a franchise, since expired. It is said that the Missouri Pacific is interested.

FOX RIVER (ELECTRIC).—An officer writes that this company, previously reported as the Fox River Valley, of which O. C. Beahnke, Manitowoc, Wis., is Manager, has already completed eight miles of track-laying and all the grading on its projected line from Manitowoc, Wis., south via Newton, Hika, Cleveland and Seven Mile Creek to Sheboygan, 30 miles. The Wisconsin Construction Co. has had the contract for the grading.

GREAT NORTHERN.—The contract for grading the Midland & Manitoba from Portage la Prairie, Man., has been let to John Prout, of that city.

HILLSBORO, KIMMSWICK & NORTHERN.—This company has been granted franchises to build a line from Meramec, Mo., to Hillsboro via Kimmswick.

JOHNSTOWN, EBENSBURG & NORTHERN.—Under this name a company has been incorporated in Pennsylvania with $250,000 capital stock to build 25 miles of road in Cambria County. G. E. Daniels, Johnstown, Pa., is President.

MIDLAND & MANITOBA.—See Great Northern.

MISSOURI, KANSAS & TEXAS.—Surveys are reported for a line from Wichita Falls, Tex., to Lawton.

MOBILE & OHIO.—An officer writes denying the report that this company has appropriated money to double-track the road from Jackson, Tenn., to Corinth, Miss. The company is reducing grades and curves to a maximum of ½ per cent. grades and 4 deg. curves.

MORELIA & TACAMBARO.—This company has begun work on a new railroad in Mexico, to run from Irapuato, state of Guanajuato, on the Mexican Central, south via Peruandiro, State of Michoacan, to Morelia on the Mexican National, Tacambaro, and then west to Ario, in all about 225 miles. The cost of building the line will be about $4,000,000. The company plans ultimately to extend its lines south and east along the Balsas River from Ario to the Pacific coast. The Mexican Government has granted concessions, giving rights of way and terminals, and exemption for five years from import duties on construction material. The State of Michoacan agrees to pay $30,000 Mexican for each 10 kilometers built in the State. The contract for the first section of about 50 miles has been let to Hampson & Smith, of Mexico City, and for 5,000 tons of 60-lb. rails to the Pennsylvania Steel Company. The road is capitalized at $6,000,000. Edson J. Chamberlin, formerly general manager of the Canada Atlantic, is president; Gilbert E. Fauquier, of the Pacific Construction Company, of Ottawa, is vice-president and general manager. Jacob L. Greatsinger, former president of the Brooklyn Rapid Transit Company, and Albert J. Payton, of the banking house of A. J. Peyton & Co., of New York, are also interested. (See Construction Record.)

NEW YORK, AUBURN & LANSING.—An officer writes that track has been laid for 15 miles on this road now under construction from Auburn, N. Y., to Ithaca, 35 miles. The Auburn Construction Co., of Auburn, N. Y., who are the contractors, expect to have the work completed by October of this year. The line is to be operated by both steam and electricity. A. H. Flint, 35 Wall street, New York City, is President.

NEW YORK, NEW HAVEN & HARTFORD.—The contract for elimination of the Dudley street grade crossing in Boston has been awarded to J. K. Ryan, of New York. The estimated cost of the improvement is $400,000.

NORTHERN PACIFIC.—Reports from the state of Washington say that this company has acquired the Port Angeles Peninsula and the Port Angeles & Olympia projects. C. M. Levey, Third Vice-President of the Northern Pacific, is quoted as saying that the Port Angeles Peninsula is to be built from Port Angeles southwest to Lake Crescent, and a number of branch lines are also to be built to timber lands in Clallam County. The ferry now in use on the Columbia river at Kalama may be used to connect Everett and Port Ludlow.

NORTH ST. LOUIS & SUBURBAN (ELECTRIC).—This company has filed a petition in the County Court at Clayton, Mo., asking for permission to build and operate an electric road from the city limits to Jennings Station.

PELHAM & HAVANA.—Incorporated in Georgia with $250,000 capital to build a line from Pelham, Ga., on the Atlantic Coast Line, to Havana, Fla., 40 miles. The incorporators are J. B. Martin, Robert Black, John Lane, W. F. Bamberg, H. C. Griggs, J. F. Lewis, Valdosta; C. J. Stephens, Milltown; C. H. Butler, Calvary; H. A. Sanders, Whigham, and W. L. Perkins, Jennings, Fla.

PENNSYLVANIA.—On the new relief line from Morrisville to Newark track laying is to be started at once. With the completion of this division the six-track system from Trenton to Jersey City will be completed. The work on the Morrisville-Newark section includes the building of the new bridge across the Delaware river from Trenton city to Morrisville. The two new tracks will be independent from the four-track system now in service, and in many places will be some distance apart.

PITTSBURG, CONNELLSVILLE & WHEELING.—This projected road, which was surveyed some years ago, may now be built. A. A. Franzheim, of Wheeling, has taken the project up, and it is reported that work is to be begun in the fall. The line is to be 60 miles long, from Wheeling, W. Va., along Wheeling creek into Pennsylvania, thence through Washington and Greene Counties, down Ten Mile creek, crossing the Monongahela river into the coke regions at Masontown, Pa., about 12 miles from Uniontown. The work will be easy.

PORT ANGELES & OLYMPIA.—See Northern Pacific.

PORT ANGELES PENINSULA.—See Northern Pacific.

SANTA FE, LIBERAL & ENGLEWOOD.—Incorporated in Oklahoma to build a line from Englewood, Kan., west to Des Moines, N. Mex., passing through Beaver County, Oklahoma. The offices of the company are to be at Raton, N. Mex. The incorporators are: F. E. Jennison, of New York; J. G. Northcutt and A. Watson, A. W. McHendrie, of Trinidad, Colo.; John Morrow and Thomas D. Lieb, of Raton, and J. H. Albright, of Hooker.

SHREVEPORT & NORTHEASTERN.—At a recent meeting of the stockholders of this company A. K. Clingman, Keithville, was elected President; A. K. Kinnebrew, of Homer, La., First Vice-President; J. B. Ardis, Shreveport, Second Vice-President; C. S. Fullilove, Shreveport, Secretary; Dr. T. E. Schumpert, Shreveport, Treasurer, and J. T. Hardaman, of Homen, Chief Engineer. It was decided to build from Shreveport, La., to Homer, via Minden, thence to Junction City, Ark., where connection is to be made with the Chicago, Rock Island & Pacific.

SOUTHERN PACIFIC.—The new Victoria division of this company, which forms a second Southern Pacific line between Houston and San Antonio and places San Antonio four or five hours nearer a seaport, was recently opened for traffic. This division has been completed by building a connecting link under the name of the San Antonio & Gulf between Stockdale and Cuero. Port Lavaca, which is several hours nearer San Antonio than Corpus Christi, will be greatly benefited as a result of the opening up of the new highway from San Antonio.

This company is reported to be planning to build a coast line from Portland south to San Francisco. The company has secured control of the Coos Bay, Roseburg & Eastern, and work is now under way on the line to connect Coos Bay with Drain, Ore., which is a short distance south of Eugene on the main line. This is supposed to be the initial work in connection with the proposed coast line.

TENNESSEE RAILWAY.—An officer writes that this company, which operates a road from Oneida, Tenn., on the Cincinnati, New Orleans & Texas Pacific south, traversing the coal and timber fields along the new river 28 miles, has given a contract to Walton, Wilson, Rodes & Co., of Knoxville, to build a 20-mile extension. Work is now under way.

UNITED RAILWAYS OF ST. LOUIS.—The United Railways Co. is planning to rebuild all of its 470 miles of lines in and around St. Louis, covering each year between 25 to 30 miles of line. Track-laying and improvements are now being made. The company will also build its cars in St. Louis.

WASHINGTON ROADS.—David T. Ham and others are planning an electric line to run from Big Falls, Wash., along the Pend d'Oreille river to a point north of Newport, 31 miles. A bill has

passed Congress authorizing the company to build a dam across the river near Fox canyon, where the power plant will be placed. Work is to begin early in 1907.

Western Pacific.—The first 20 miles of track west from Salt Lake City have been completed.

Wilkes & Lincoln.—This company has been incorporated in Georgia to build a road from Washington, Ga., to Lincolnton, 50 miles.

Wolf River.—See Chicago & North-Western.

RAILROAD CORPORATION NEWS.

Auburn & Syracuse Electric.—N. W. Harris & Co., New York, are offering at 104½ $100,000 first and refunding 5 per cent. bonds of 1942, being part of an authorized issue of $2,000,000, of which $1,150,000 is outstanding, the remainder being reserved for future extensions and additions. The A. & S. operates 13 miles of road in Auburn, N. Y., and 24 miles between that place and Syracuse, which city it enters by trackage rights over the Syracuse Rapid Transit.

Boston & Maine.—It is announced that the shareholders have subscribed to 38,457 shares of the 63,319 shares of common stock recently offered to them at the rate of one share of new stock for every five shares already held. (July 27, p. 26.)

The gross earnings of this company for the year ended June 30, 1906, were $39,214,202, an increase of $3,000,957; net earnings, $9,860,834, an increase of $267,329. The surplus, after charges, dividends of 7 per cent. on the common stock and 6 per cent. on the preferred stock, was $217,274, an increase of $140,347.

Chicago & North-Western.—A meeting has been called for Oct. 18 to authorize an increase of the authorized capital stock from $100,000,000 to $200,000,000. There is now outstanding $99,996,165, of which $77,601,045 is common, so that if the increase is authorized it will allow a total issue of $177,604,880 common stock.

Chicago, Milwaukee & St. Paul.—An issue of $24,802,809 of the $25,000,000 treasury common stock is to be issued at par to the holders of the $107,826,300 common and preferred of record on August 29 at the rate of 23 per cent. of their holdings. This will make the total outstanding common stock $82,986,709. The right to subscribe must be exercised on or before Sept. 25.

Consolidated (N. Y., N. H. & H. Electric Lines).—It is reported that a new holding company has been formed to take over the properties of this company in Massachusetts or perhaps the lines in both Massachusetts and Connecticut. The reason given is the Massachusetts law prohibiting ownership directly or indirectly of street railway lines by steam railroad companies.

Coos Bay, Roseburg & Eastern.—See Southern Pacific.

Delaware & Hudson.—The gross earnings for the year ended June 30, 1906, were $12,261,101, an increase of $670,543; net earnings, $4,673,255, a decrease of $12,460, the operating ratio having increased from 62 per cent. to 70 per cent., evidently because of the anthracite coal strike in Pennsylvania during the last quarter of the year. The surplus after charges was $1,659,670, a decrease of $100,397.

See Rensselaer & Saratoga.

Fort Smith & Western.—The St. Louis, El Reno & Western, recently acquired by the Fort Smith & Western, has filed a certificate of a decrease of capital stock from $1,240,000 to $970,800.

Glens Falls.—See Renssalaer & Saratoga.

Missouri, Kansas & Texas.—The gross earnings of this company for the year ended June 30, 1906, were $21,159,145, an increase of $1,118,050; net earnings, $5,744,600, an increase of $641,225. The surplus was $1,244,052, an increase of $402,042.

New York & Long Island.—This company, which is back of the so-called Belmont tunnel, has paid $240,000 for four lots at Fourth street and Jackson avenue, Long Island City.

Norfolk & Western.—A meeting of the shareholders has been called for Oct. 11 to authorize an issue of not more than $34,000,000 convertible bonds, and an issue of the same amount of common stock, making the total authorized issue of common stock $100,000,000. It is announced that the new bonds are authorized for the purpose of providing money likely to be needed for building many spurs to coal mines and for other improvements.

Northern Central.—Townsend, Scott & Sons, Baltimore, have sent to the minority stockholders of this company, which is controlled by the Pennsylvania, a circular letter announcing an effort to get larger dividends on the $17,193,400 outstanding capital stock.

Northwestern Elevated (Chicago).—It is announced that $3,000,000 first refunding mortgage 4 per cent. bonds of 1911, convertible at par into 5 per cent. non-cumulative preferred stock, are to be issued. A corresponding increase in capital stock has been made to provide for the conversion. There are now outstanding $14,000,000 of these bonds. The additional issue is to provide for betterments and extensions heretofore paid out of surplus earnings.

Pennsylvania.—See Northern Central.

Philadelphia Company.—The stockholders have authorized an increase from $30,000,000 to $36,000,000 in the common stock. The increase is for the purpose of reimbursing the company for the purchase of the capital stock of subsidiary roads and for improvements and extensions of the Pittsburg Railways Co. and the Alleghany County Light Co. (June 15, p. 176.)

Rensselaer & Saratoga.—This company has merged with itself a proprietary line, the Glens Falls Railroad, which runs from Fort Edward, N. Y., to Caldwell, 15 miles, and has no bonded debt. The R. & S. is leased in perpetuity to the Delaware & Hudson.

St. Louis, El Reno & Western.—See Fort Smith & Western.

St. Louis, Iron Mountain & Southern.—This company has applied to the New York Stock Exchange for permission to list $1,630,000 additional River & Gulf division first mortgage 4 per cent. bonds of 1933, making the total amount outstanding $24,384,000 out of the $50,000,000 authorized.

Southern Pacific.—A semi-annual dividend of 2½ per cent. has been declared on the $197,849,258 outstanding common stock. This is the first dividend ever declared on the common. The estimated earnings for the year ended June 30, 1906, are as follows:

	1906.	Increase.
Gross earnings	$105,619,113	$7,478,531
Net earnings	35,032,464	3,485,502
Surplus after charges	21,560,713	8,977,293
Dividend (7%) on preferred stock	2,769,879	2,769,879
Balance	18,790,834	6,207,416

This company has bought, for a price said to be over $1,000,000, the Coos Bay, Roseburg & Eastern, which runs from Marshville, Ore., south to Myrtle Point, 26 miles. It is said that this line will be part of a new trunk line between San Francisco, Cal., and Portland, Ore. The C. B., R. & E. has been in the hands of a receiver for some time. According to the balance sheet of June 30, 1897, which contains the latest figures available, the capital stock was then $2,000,000, and there were outstanding $625,000 of the $2,000,000 authorized first mortgage 6 per cent. bonds of 1921.

Union Pacific.—According to an official statement, at a meeting of the directors of the Union Pacific and Southern Pacific held on Aug. 15 the question of dividends was referred to the executive committees which met the next day at 3 p.m. Announcement of the dividends was made to the New York Stock Exchange just before the opening on Aug. 17. A semi-annual dividend of 5 per cent. was declared on the U. P. common stock, of which $195,200,900 was outstanding on June 1, 1906. It was announced that 3 per cent. of the dividend was charged to surplus earnings and 2 per cent. to other income. As the Union Pacific owns $90,000,000 of the Southern Pacific common stock the 2½ per cent. semi-annual dividend declared upon the last named security makes a large increase in the "other income" of the Union Pacific. The previous annual dividend rates on U. P. common have been as follows: 3½ per cent. in 1900, and 4 per cent. thereafter until October, 1905, when a semi-annual dividend of 2½ per cent. was declared, this rate being increased to 3 per cent. in April, 1906. The estimated earnings for the year ended June 30, 1906, were as follows:

	1906.	Increase.
Gross earnings	$67,281,542	$7,956,593
Net earnings	30,317,769	2,855,534
Surplus after charges	29,201,844	6,416,337
Dividend (4%) on preferred stock	3,982,032	Decrease, 324
Balance	25,219,812	6,416,661

Wabash.—A meeting of the stockholders and debenture bondholders has been called for October 22 to authorize an issue of $200,000,000 4 per cent. 50-year refunding mortgage bonds dated July 1, 1906. Part of this amount will be reserved to refund existing mortgage bonds and all promissory notes and equipment obligations, while the balance is to be used for betterments, extensions and equipments. This meeting is also to authorize preferred stock to be increased at $16,500,000 and the common stock $81,500,000, and to authorize the exchange of the A and B debenture bonds for the new bonds and the preferred common stock according to terms authorized by the Board of Directors. (June 15, p. 176.)

The gross earnings of the company during the year ended June 30, 1906, were $25,015,378, an increase of $318,778; net earnings, $6,937,491, an increase of $2,744,335.